THE
SCIENTIFIC AND LITERARY REVIEW,

AND RECORD OF PROGRESS IN ARTS, INDUSTRY, AND MANUFACTURES,
INCORPORATING THE
Journal of the Inventors' Institute.

REGISTERED FOR TRANSMISSION ABROAD.]

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VOL. VIII.—NO. 12.]
[NEW SERIES.]

DECEMBER 1, 1873.

[PRICE 6d.

*** *Communications to the Editor to be addressed to him at 21, Cockspur Street.*

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THE INVENTORS' INSTITUTE,
4, ST. MARTIN'S PLACE, TRAFALGAR SQUARE.

Chairman of the Council—**SIR ANTONIO BRADY.**

THE various efforts which have been made, and the numerous influences now at work to injure, if not to destroy, Patent Rights; the inefficiency of the many well intended, but ill considered, schemes of Patent Law Reform which have from time to time been suggested, and the tendency of which has generally been to prejudice the Inventor, without advantage to the Public; together with the proceedings so essentially involving the interests of inventors which have already taken place in Parliament, show the necessity of an immediate and active co-operation on the part of those interested in Inventions and in Patent Property, and that an Association for the Protection and Defence of Patent Rights is urgently needed. This Institute has, therefore, been established for the purpose of uniting and organizing the influence of Inventors, Patentees and others. Its objects are:—

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2nd. To promote improvements in the Patent Laws.

3rd. To facilitate the diffusion of information with reference to Inventions and other subjects beneficial to Inventors and Patentees.

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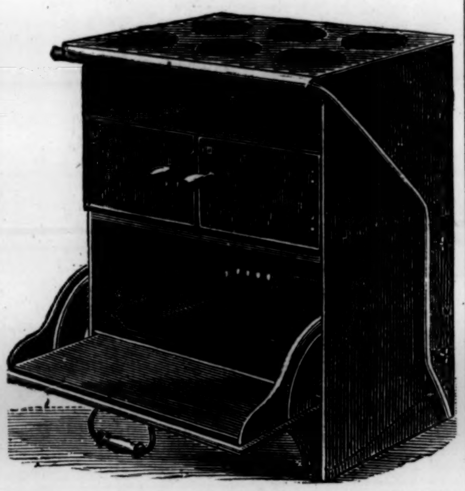

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*** In this list (Com.) means Invention communicated from abroad.
Further information, as to the progress of these Patents by Notice to Proceed, Sealing, and Specifying, can be obtained at the Office, 21, Cockspur-street, Charing Cross.

On August 19th.—2738 to 2746.—J. Weir Sewing machines.—H. Kenyon. Apparatus for the manufacture of sulphate of soda, chlorine, hydrochloric acid, and cements.—T. Collieu. Construction of umbrellas.—J. M. Goodall. Envelope-folding machines.—A. Théry. Purifying feed-water of steam boilers.—W. E. Newton. Treatment of felted, woven, and spun fabrics (com.)—W. R. Oswald. Steering apparatus.—J. Hanauer. Manufacture of table cloths or covers.—A. M. Clark. Construction of granaries and other receptacles for corn, part of which improvements is applicable in building houses and other structures (com).

On August 20th.—2747 to 2761.—R. Turner and G. R. Rollason. Arrangement for counteracting the weight of pendant sliding chandeliers, thereby superseding the use of counterpoising weights, with their attendant chains and pulleys, applicable to all such fittings required to be raised and lowered, without regard to the material used for illumination.—A. Young. Chains.—J. Musgrave and T. F. Shillington. Stoves and apparatus connected therewith for heating.—J. H. Johnson. Steam engines (com).—P. Villiers and J. Mayer. Apparatus for the impregnation of air for supplying the lungs or other parts of the body.—C. Knoblauch. Furnace grates. (Complete specification.)—T. Matthews. Making "diamond seating," which may be used as a substitute for hair cloth.—J. O. Spong and G. M. Spong. Apparatus for signalling between parts of railway trains, which improvements are applicable to signalling or attracting attention in other cases.—C. Carter. Apparatus for drawing and preventing waste of water from pipes, mains, cisterns, or other sources for domestic or other purposes, also for waterclosets.—E. T. Hughes. Paneling and moulding machine (com).—E. A. Thomson. Tools or instruments for spreading gum, paste, glue, or other uniting materials and liquids.—W. R. Lake. Traction engines (com.)—A. M. Clark. Apparatus for regulating or controlling the supply of gas or water in buildings (com.)—W. H. Hughan. Treatment of night-soil, sewage, and other like refuse matters, and in the production of materials capable of being employed for the purposes of deodorization.—G. Haseltine. Solvent obtained by the distillation of crude turpentine (com.)

On August 21st.—2762 to 2780.—J. Green. Blast furnaces.—W. H. Edwards. Method of and apparatus for mounting photographic pictures.—J. Pell, jun. Railway points or switches.—

BRITISH MUSEUM

W. G. Cumming. Sewing machines.—R. Gibbon. Manufacture of soap.—W. R. Lake. Machinery for hulling and separating rice or other grain or seed (com.)—A. Destony. Cigar holders.—S. T. Rowe and I. C. Johnson. Means of and apparatus for condensing and rendering harmless arsenious, chlorous, sulphurous, and other unpleasant and deleterious gases or vapours that are given off in the manufacture of Portland and other cements and limes, as well as in the treatment of mineral and metallic ores.—T. H. Rushton and R. Tonge. Machinery for spinning and doubling.—H. B. Barlow. Preparing peat and machinery employed therein, also manufacture of fuel (com.)—F. Cole. Railway signalling apparatus.—C. Catlow. Looms for weaving.—J. Greenwood and J. Dennell. Apparatus for piercing and for perforating leather or other like substances.—H. W. Hauberg. Process for separating or removing the tin from scraps or cuttings of tinned or terne plates.—M. Martin. Construction of balloons and other aerial bodies, and in the means of navigating them so as to control the direction in which they shall move or travel.—B. Sleap. Cinder sifter.—J. Wright. Method of treating zinc alloys for the purpose of recovering the zinc therefrom (com.)—W. R. Lake. Apparatus for the production of light from benzine, naphtha, and other like substances (com.)—W. L. Wise. Wheels for railway rolling stock (com.)

On August 22nd.—2781 to 2787.—W. Warren. Pumps.—L. M. Brachigny and J. E. Deschamps, fils. Machinery for obtaining motive power by means of water and air or other fluids.—A. C. Henderson. Mode of indicating or determining the difference of time between foreign countries, islands, cities, or towns as compared with that of England, the said improvements being applied to time-pieces, clocks, or watches (com.)—A. F. Wilson. Apparatus for lighting and extinguishing public and other lamps or lights.—S. W. Allen. Steam striker or hammer.—W. Pretty, jun. Corsets.—W. Smith. Apparatus for generating heat in steam boilers and furnaces.

On August 23rd.—2778 to 2791—T. Hyatt. Illuminating roofs and shutters and walking surfaces for streets, applicable also to the decks of vessels, and the construction and mode of securing the glasses for the same.—H. Zingler. Carriage lamps (com.)—W. Crookes. Treatment of waste or refuse animal or nitrogenous matters for the purpose of producing fertilizing substances or artificial manures.—R. Goodall. Means or method of treating and clarifying impure or waste water for fulling mills, scouring mills, or scouring processes, dyehouses, sewage, or other impure waters.

On August 25th.—2792 to 2797.—E. Kappmeyer. Sewing machines.—B. Hunt. Locks and keys (com.)—B. Hunt. Compound faucets (com.)—J. P. Clark. Improvements applicable to casks and barrels and other similar articles of manufacture.—J. Nickoll. Signalling apparatus and the lamps and lenses employed therein, the said improvements being partly applicable for use in ships and partly for other purposes.—J. G. Jones. Rotary engines.

On August 26th.—2798 to 2813.—J. H. Johnson. Machinery or apparatus for making bricks and similar articles (com.)—F. W. Jackson. Machinery for raising building and other materials, and which is called the "Excelsior" barrow hoist.—F. Calver. Flower-pot.—W. H. Skidmore. Buffer and coupling apparatus of railway carriages, trucks, and other rolling stock (Complete specification.)—W. Cunliffe. Machinery of metallic articles and structures for useful and ornamental purposes.—W. A. Brown. Railway trucks.—C. Harris. Machinery or apparatus to be employed in the manufacture of paper bags.—G. W. R. Campbell. Means or apparatus for preventing vessels dragging their anchors.—J. T. Staniland. Improvements applicable to corn and other screens.—A. M. Clark. Means of utilizing the rise and fall of the waves for the propulsion of vessels (com.) (Complete specification)—N. W. Hornstedt. Method of establishing communication between a railway train and the stations or other part of the line of railway, and vice versâ, or between one train and another.—C. Schacher and L. Feret. Furnace for burning the waste or residue of wood or other vegetable substances, applicable to steam boilers and other industrial purposes.—B. J. B. Mills. Couplings for shaftings and in hubs for wheels or pulleys (com).—B. J. B. Mills. Battery guns or repeating ordnance (com).—W. R. Lake. Machine for forming the internal screw-threads of gas fittings (com).—D. J. Kennelly. Distilling shales, coals, peat, and other bituminous substances, and the manufacture of peat fuel and peat charcoal in connection therewith, and the apparatus employed therein.

On August 27th.—2814 to 2830.—W. Housley. Construction of boilers for the generation of steam.—R. S. Norris. Arrangements and apparatus for preventing blown-out shots in mines and quarries.—A. Thomson. Construction of screw steam-ships.—T. A. Brockelbank. Apparatus for facilitating the connecting and disconnecting of the carriages of railway and other trains.—G. Hodgson. Construction of parts of looms.—J. H. Johnson. Mechanical puddling furnaces (com).—J. Crowley, jun. Grinding and polishing, and the machinery employed therein.—W. E. Newton. Machinery for hackling and combing flax, wool, and other fibrous substances (com).—I. Summers. Apparatus for economizing fuel used for domestic purposes.—F. Osbourn. Machinery for cutting or shaping by what are commonly called band saws or knives.—A. M. Clark. Watch regulators (com.)—J. Durant. Means of administering medicines to horses, dogs, and other animals.—C. Farmer and J. S. Turner. Machinery for the manufacture of split cotter pins or lynch pins.—E. A. Cowper. Moulds for casting steel ingots.—W. R. Lake. Guards for the shuttles of looms for weaving (com).—F. Condit. Arrangement of harnesses and harness shafts in looms for weaving ribbons and other narrow fabrics.—H. Smith. Carving-forks.

On August 28th.—2831 to 2843.—G. A. Scott. Manufacture of brushes (com)—L. R. M. Péan. Spinning tops.—J. Romanes. Manufacture of capsules.—W. H. Maitland. Manufacture of gas, and apparatus employed therein (com.)—A. M. Clark. Umbrella and parasol frames (com.)—F. W. Follows and J. Bate. Lawn mowing machines, part of which improvements are applicable to machines for cutting the edges of lawns, and also to garden rollers.—W. R. Lake. Machines for trimming books and cutting paper, and similar materials (com.)—C. D. Abel. Process for the production of soda and potash from their respective haloid salts by the direct wet method (com.)—C. Crowther and T. M. Morgan. Apparatus for coating metals.—J. H. Johnson. Apparatus for generating hydrogen or carburetted hydrogen gas, and the means for evaporating the dilute acid employed in generating the gas (com.)—E. H. Leveaux. Method of connecting various metropolitan railways by means of a central station with each other and with the water traffic on navigable rivers.—W. J. Walsh. Gas chandeliers or gaseliers, and gas and other lamps.—P. A. Muntz. Process of and apparatus for condensing and collecting the fumes evolved by furnaces used for melting metals and for other metallurgical operations.

On August 29th.—2844 to 2854.—J. Macintosh. Compounds for waterproofing textile fabrics, also applicable to other purposes.—C. Cross. Manufacture of velvets, corded velours, and other pile fabrics.—B. Toulson. Drying cylinders, and the method of removing water and impurities therefrom.—G. Davies. Apparatus to be used in the manufacture of festooned edging or trimming (com.)—J. Harrison. Apparatus for sharpening and gulleting the teeth of saws, which apparatus is also applicable for other similar purposes.—T. Westley and W. Westley. Sewing machines.—J. J. Purnell and R. Gorrill. Bush and closure for holes of casks or analogous vessels.—W. R. Lake. Railway carriage springs (com.)—F. Moline and T. G. Stock. Apparatus for filling sugar and other casks, and for compressing the contents during the filling.—P. S. Horsman. Machinery for spinning, doubling, or twisting fibrous substances.—C. E. Spooner. Mode of locking railway points.

On August 30th.—2855 to 2869.—R. Milburn and H. Jackson. Manufacture of fuel from peat and other materials, and apparatus employed in such manufacture, parts of which apparatus may also be employed in the filtration and drying of sewage deposit and other matters, and the moulding of bricks, tiles, and other articles formed from plastic materials.—C. Tysoe. Means for supplying tar, oil, creosote, spirit, or other ignitable fluid or fatty matter to furnaces, and for promoting the combustion of such matters.—J. E. Barraclough. Kitchen ranges or fireplaces, ovens, and boilers.—F. S. S. Darby and W. F. Hobrow. Machinery for sawing stong—J. Scharr. Wool-washing and steepine machine.—J. C. A. Henderson. Treatment of peat and other substances, and apparatus therefor, part of which is applicable to other purposes.—W. Mitchell. Obtaining motive power.—R. Hattersley, C. Hattersley, and T. Hattersley and H. M. Ashley. Means of economising fuel and the apparatus employed therefor.—T. Roebuck and J. W. Lamb. Apparatus for ventilating.—G. Lowry. Machinery for drilling, boring, slotting, and wheel cutting.—S. Hallam. Construction of safety valves.—H. Bassett. Valve trumpets and French horns.—J. Coey. Package for butter.—W. Penrose. Production of fuel.—J. Shanks and J. Thyne. Steam boilers.

On September 1st.—2870 to 2878.—J. B. Stearns. Electric telegraph apparatus.—H. W. Hammond. Compound blower (com.)—J. Hill and L. S. Hill. Paving or forming the surface of streets or roads.—D. A. Fyfe and W. H. Bewers. Recovery of alkali from the liquid in which esparto, wood, straw, or other material has been boiled.—C. S. Smith. Apparatus for suspending pictures and mirrors, and for other like purposes.—J. Palmer, jun. Ram-warships and torpedoes employed in connection therewith (com.)—M. Henry. Steam engines (com.)—E. Johnson and C. Johnson, and G. F. Pabst. Presses for colour printing.—W. M. Adams, B.A. Astronomical instrument for exhibiting the position of the heavenly bodies with relation to the earth.

On September 2nd.—2879 to 2891.—W. Walker. System of separating, softening, and dressing hemp, flax, Manilla hemp, jute, rhea or china grass, New Zealand hemp or grass, aloe, and other similar fibrous materials, whether the same have or have not been previously prepared or manufactured, so as to render the same available for manufacturing or remanufacturing, or for use as oakum, lint, or tow, or for other purposes, and the machinery and apparatus therefor.—B. J. B. Mills. Sewing machines (com.)—J. Robertson. Indicating and registering the number of persons who enter and leave tramway cars, omnibuses, public halls, steamboats, or other places of public resort, and the apparatus or means employed therefor.—J. Palmer, jun. Turret ships (com.)—W. Thomas. Busks for stays and bodies.—E. H. Hatton and G. Hatton Apparatus for building and releasing cords, ropes, and bands employed in connection with venetian roller and other window blinds, skylights, and house fittings and appliances.—I. Barker. Manufacture of spades, shovels, and other implements, and in the means or apparatus to be used therein.—J. Bird, J. Wirth, J. Fogg, and J. Oldham. Stiffening felt hats.—T. Arnold. Apparatus for heating the feed-water in steam boilers.—E. Edwards. Apparatus for producing optical and mechanical illusions in theatrical exhibitions.—H. Green and J. Barrow. Effecting the ignition of gas, and apparatus and means for opening the supply of gas to burners, for igniting the gas, and for extinguishing gas lights.—J. Parkes. Window-sash fasteners, also applicable to other purposes.—S. H. Johnson. Method of and apparatus for separating free sulphur from substances containing it.

On September 3rd.—2892 to 2905.—J. E. F. Lüdeke. Instrument for mechanical drawing and measuring.—L. M. Becker. Spools or bobbins for sewing purposes and in spindles therefor.—D. Mackay. Omphalic blisters.—W. A. Richards. Moulds for casting ingots of steel.—A. B. Childs. Windows in the doors of railway carriages to prevent dust and dirt from entering the carriages while in motion.—R. Sutcliffe. Apparatus for heating the feed-water for steam-boilers, and in the means or method of and appliance for cleaning feed-water heating apparatus.—E. Brasier. Machinery or apparatus for laying and forming concrete, asphalte, and other similar roads.—J. Whitehead. Machinery for spinning and doubling cotton and other textile materials.—J. C. Haddan. Envelopes (com).—E. H. Yarrow. Manufacture of gas for lighting and heating purposes, and in furnaces and apparatus for the same (com).—C. E. de Lorière. Apparatus for transmitting motive power, and for overcoming the usual loss of power, at the dead points of rotatory machines.—W. Stobart. Weighing machines.—G. Haseltine. Mode of separating and obtaining gold, silver, and other metals from their ores (com).—G. Haseltine. Method of and means for cleansing surface condensers (com). (Complete specification.)

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Scientific and Literary Review,
AND RECORD OF PROGRESS IN
ARTS, INDUSTRY, AND MANUFACTURES,
INCORPORATING THE
JOURNAL OF THE INVENTORS' INSTITUTE.

DECEMBER 1, 1873.

RETROSPECTS AND PROSPECTS OF PATENT LAW REFORM.

The opening address, delivered at the first members' meeting of the present session of the Inventors' Institute, by Mr. Hume Williams, Barrister-at-Law, Vice-Chairman of the Council of the Institute, in consequence of its giving a general retrospect and clear exposition of the present prospects of Patent Law Reform, we deem worthy of the most prominent place in our journal. Mr. Williams begun by stating that a few hours ago he was not aware that the honoured chairman of the Council, Sir A. Brady, would not be able to attend the meeting. He had, therefore, had but little time to prepare himself for his task; under these circumstances he must confine his observations principally to one topic, namely, the position of the Inventors' Institute in regard to the Patent Laws. There is (said Mr. Williams) no doubt in the world that within the last three or four years there has been a disposition on the part of inventors and others taking an interest in the subject, to bring the Patent Law question to a practical settlement. We have had, at the Inventors' Institute, on occasions when the Patent Laws have been discussed, men who differ from us on many points; we have had Mr. Macfie, and other known opponents to the Patent Laws, who had stated views in opposition to the existence of patent protection, and by coming amongst us they had found that the right to property in invention was far stronger than they had thought it, and they had gone away, he might say, satisfied that the patent question was a more difficult question than they considered it to be before they came to the Institute. In regard to the position of this question it was to be remembered that repeated inquiries had been instituted by Committees of the House of Commons and by Royal Commissions, which have reported thereon, but their deliberations have come to nothing so far as legislation on the subject of reform of the Patent Laws was concerned. Before anything as regards sweeping legislation takes place, experience has shown us that it seems desirable an intermediate or medium course is suitable to be adopted. Some reduction as regards the cost of affording protection to inventors is wanted, and that cost should be such as will secure to the original inventor the work of his own hands. There have been various plans spoken of in reference to improvement of the Patent Laws, and I was informed some time ago that a Bill was to have been brought forward in Parliament by the present Government, but that opposition, set on foot by the Institute, had put a stop to any legislation on the subject, the views of intelligent men, taking broad and liberal views, having been found to coincide with those of the Institute. But if a Bill were introduced that the Institute felt was just to the inventor's cause, then its support would be ready and hearty, and they have left the nature of their views in no doubt for the Invention Right Bill, an abstract of which was published in a recent number of the Scientific and Literary Review, is a full exponent of them. I may remind you that within the last year a conference has been held in Vienna on the subject of the Patent Laws of various countries, and men of different views on the question have met on common ground to discuss whether or no it is possible that an international and improved Patent Law could be promulgated. The Institute, I am happy to say, was very efficiently represented thereat by one of our esteemed members of the Council, Dr. R. H. Collyer, whose outspoken opinion is to be found duly recorded in the Institute's Journal (The Scientific and Literary Review). Some common settlement was sought to be urged, and some model of an existing law it was suggested should be taken, as, for instance, that of England or of America, so that instead of seeking one protection in England, another in France, another in the United States, and so on with each individual country, one law should embrace the whole. Although the Institute is still working on in hope of speedy success, strongly striving as it has been from the commencement of its existence for the great desideratum of a sound Patent Law, yet I am afraid that next year will see no further solution of the question than at present, for various other matters of greater political interest will take up the time of the Legislature, and further, considering that this Parliament is moribund, we cannot hope that the solution of the question can be brought to a practical issue till the next Parliament meets, but we hope that when that solution is sought to be attained, the law will give protection to every inventor, not as now, upon payment of exorbitant charges, which literally confine patent protection to the monied portions of the nation. Not long since I met Mr. Webster, Q.C., and he expressed his hope to have been present this evening, and take counsel with the Institute, so that a practical settlement be brought about, for it must be remembered that the Institute, by its members, expands itself all over the country, and it is imperatively necessary that their views should be heard and considered, and, above all, the pecuniary position of such inventors as belong to the working classes, who are a large proportion of the great body of inventors at present. The original inventor, when a poor man, prefers to take his invention abroad, where, for a very small outlay, the fruit of his mental labour can be protected. We hope in the course of the ensuing session of the Institute that the matter may be again discussed, and some steps taken for the settlement of the improvement of the Patent Law, or, at least, measures for obtaining a great reduction of patent fees, set on foot. It may be thought that when our views on the Patent Laws are accomplished that the Institute will retire from the field as having done its duty; but this is far from the case; our principal desire, after having an improved law, will be to develope inventive genius, and make the Institute an organisation where the practical and working man may promulgate his ideas. And, indeed, the Council has it in contemplation to offer relief. If any working man can satisfy the Council of the Institute as to the utility of his invention, then, after being thoroughly examined into, the Institute might afford him the means of protecting his invention, that is if such a course could be adopted with success, and, further, might give him the aid of its counsel in practically developing his ideas, and it is my hope that the Council may see its way clear to arrange that any practical workman who can during the year show that he has made such improvements in machinery or manufactures as conduce to great advantage in any branch of manufacture, shall have a medal awarded to him, of, say, ten guineas value. Mr. Williams then referred to the loss the cause of Patent Law Reform and the Institute had sustained by the death of its late Secretary, Mr. Latham, who was one of its founders, and one whose energetic and able efforts had done more than those of anyone else to place the Patent Law question on a right basis, and render the Institute useful and important; although comparatively young (38 years old) he possessed the practical knowledge and business talent of a man of the most mature age, and his memory was endeared to all who knew him for the many genial and generous qualities of his character. Another loss to the Institute was occasioned by the death of Mr. Cornelius Varley, an nonogenarian veteran of science, whose talent and estimability were so well known as to render eulogy superfluous. Mr. Williams then proceeded to make some remarks as to the conflicting interests of capital and labour, which, he said, were likely to force themselves upon the consideration of the Inventors' Institute, and concluded by requesting the Secretary (Mr. Campin) to state what arrangements had been made as to the various meetings to be held during the session.

General Literature.

A Treatise on Medical Electricity, Theoretical and Practical, and its Use in the treatment of Paralysis, Neuralgia, and other Diseases.

By JULIUS ALTHAUS, M.D., M.R.C.P. London, Physician to the Infirmary for Epilepsy and Paralysis. Third Edition. Enlarged and Revised. With 147 illustrations. London: Longmans, Green, and Co. 1873.

THE last edition of this very valuable treatise being out of print, Dr. Althaus has carefully revised the book, and incorporated with it the results of all the recent work done in this department of science. Not only has a large amount of new matter been added, but the pruning-scissors have been freely used for eliminating what was no longer required, either in disposing of now antiquated theories, or in proving facts which have since then become self-evident. The quantity of new matter in the present edition is therefore much more considerable than would appear merely from the increased size and number of pages. The physiological part of the subject has been carefully brought up to the level of the day; the chapter on diagnosis has been amplified, special attention having been drawn to the value of faradisation in detecting malingerers, and as a test for death soon after its occurrence; the clinical chapter has also been rendered fuller, and enlarged experience has enabled Dr. Althaus to answer the numerous questions connected with the therapeutical use of electricity in a more precise manner.

Dr. Althaus remarks that the electrolytic treatment of tumours has been much practised in the interval between the appearance of the second and third editions; and although, as he truly says, this particular branch of the subject appears to be still in its infancy, yet indications are not wanting that it will soon occupy a far more important place in therapeutics than many eminent surgeons were willing to believe, when he first suggested this plan of treatment six years ago.

The author of this treatise is so well known as an eminent authority in his branch of medical science that it is scarcely necessary for us to speak in praise of the work before us, which as now presented to the world by this third edition is an elaborate and exhaustive treatise ranging over the entire subject of electricity and its application to medical uses; for he does not confine himself to the bare details of the medical applications of electric power, but gives ample information as to electricity and electrical apparatus of various kinds, and then describes their medical uses.

The work being thus comprehensive in its range, and hence including much information on practical electricity, we are at a loss to select a specimen of its contents, the subject matter of which has not already been introduced to the notice of our readers. Perhaps the following, taken from the chapter on electro-therapeutics is as good an exemplar of what is peculiarly noteworthy as any part of the work.

Referring to the course to be adopted in regard to the extent and duration of the application of electrical treatment, Dr. Althaus observes—"A good rule for practically settling such question is the following: *Discontinue the treatment when the patient ceases to improve, or when he gets worse instead of better, or when symptoms of galvanic saturation of the system begin to make their appearance.*"

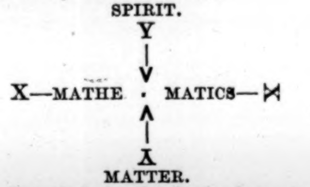
In speaking of a saturation of the system with galvanism (a subject to which no previous writer has alluded), "I do not," says the Doctor, "mean a material accumulation of the galvanic fluid, which could be compared to the accumulation of certain poisons, such as arsenic, strychnia, or digitalis; of these we know that sometimes, after having been given in minute doses for a certain period without apparent effects, they suddenly cause violent symptoms, which must be traced to an undue quantity of them having accumulated in the system. But, while arsenic may still be discovered in the system ten days after the last dose has been given, the galvanic current ceases to circulate as soon as the application is over. It is, therefore, only the *effects* of the application of galvanism which can give rise to symptoms of saturation. Faradic electricity never seems to lead to such symptoms at all, probably because it has no or only slight constitutional action. The continuous current, on the other hand, which has a far more profound influence on the central nervous system and all the processes of nutrition throughout the body than Faradism, not unfrequently causes symptoms which if present should induce us to discontinue the treatment, at least for a time. The most striking of these symptoms I have found to be *a persistent galvanic taste*, which does not disappear, as it generally does, immediately or soon after the application, but lasts the whole day and night afterwards, and sometimes even longer. Other symptoms of galvanic saturation are disturbed sleep, restlessness, singing in the ears, vertigo, and a general sense of lassitude. If these are perceived in the fourth, sixth, or eighth week of galvanic treatment, they show that the system is becoming over-polarised, and that the galvanism has ceased to be useful. I have never continued the treatment under such circumstances, for the mere purpose of seeing what degree of over-stimulation might be reached, and what amount of harm a continued application might do in a given case. I am, therefore, unable to say what would be the result of such a proceeding. But I have no doubt that serious mischief would result by continuing the treatment contrary to common sense in such cases; just as we know that harm is done when the use of arsenic, digitalis, or strychnia is pushed beyond reasonable limits. As a rule, nothing but discontinuance of the galvanic treatment is required for relieving symptoms of saturation, but if hyperœsthesia should be marked, twenty grains dose of bromide of potassium two or three times a day for a few days a week would be appropriate."

Spirit and Mind Polarity; or, the Disentanglement of Ideas.

By ARTHUR YOUNG. First part. London: Houlston and Sons; Worthing: W. Paine.

To afford our readers any definite and distinct notion of the true character and contents of this work is a matter of extreme difficulty. It seems to be an *exposé* of the phantasms of a religious metaphysician, who considers he has found in the Cross an apt means of formulating his views as to many mental, moral, and religious theorems; and in order to make this perfectly plain to the reader, the author has given several illustrative plates, showing forms of ornamental crosses, the arms of which have words running into and crossing each other. Possibly these remarks may leave our readers with the notion that the work is wanting in rationality, though it is really a production well worthy of attentive perusal, as developing ideas which, if not so novel as they at first appear, yet have the merit of being put in a very striking way. Perhaps as good a notion of the *rationale* of the author's system may be obtained from his preface:—

It is now many years ago that the germ of the work actually presented in its fuller growth, was first laid in my mind, by the pressure of an earnest desire at the systematising—or formulating and imaging to myself succinctly and fixedly, or upon one invariable and also condensed plan if at all possible—the more fundamental Ideas of Moral and Mental and also Social and Religious Philosophy, as treated of by a great variety of writers in an equally great variety of often-times confused and contradictory ways; and the germ thus laid being that of the Idea of the Antithesis and yet Interconnection of the Spiritual and Material—or the Idea of a Trinity in Unity, of Active or *Moving* Spirit—Passive or *Moved* Matter—and their mutual interconnection in some resulting Neutral or Mathematical *Movement*—a movement, that is, in *lines* of some sort, and which I symbolized thus:



I was then led, in the first place, to more complicated symbolical figuring, and was only recalled from the path thus entered upon, to the simplicity of the actual Method, to the Method indeed from which I had originally started, by stumbling accidentally, as it were, but at a very critical period of my elaboration, upon the following passage in Dr. E. H. Nolan's History of British India.

"The Buddhists of Tartary used the sign of the Cross as a charm to dispel invisible dangers, and reverenced the form of the Cross in many ways. . . . . . . In every nation possessing a Creed or a Philosophy the same sign has been used. . . . . . . At Nineveh it was found among the ruins as a sacred emblem. In Egypt it was similarly used, as is well known. The Spanish priests were astonished to find the Cross worshipped in Mexico."

Mr. Young, after further remarks of similar character, adds:—

My employment of the term "Mystery of the Cross" on the title-page of the First Edition was, therefore, in allusion to the mystery of the symbol of the Cross, having thus led the van of Man's Progress since Man was. But the mystery is now made plain! It so led the van, because around that Ideal, all the other Ideals of man, the Ideals of his Soul-Affection and Body-Sense, of his Mind's Instincts and Intellect are found to entwine as the heart-strings entwine with the heart itself. What leads Man on if it be not Ideas? And if so, could it be otherwise than that the Idea of Ideas,—the Idea, namely, which carried along with it the supreme law of their joint ordering, for the purposes of Man's Good, Man's Happiness, and Man's Perfection, should be held aloft in all ages and all nations by the leaders of their kind?

But I need not comment farther. Whether the outburst was one of mere idle, or of truthful enthusiasm, will be decided, according as the work itself is recognised or denied, as in conformity to the truth or actuality of Man and his circumstances; and I shall, therefore, probably best complete this part of my task, by stating more particularly, but shortly, in what the work consists.

The work, then, consists of three plates or diagrammatical representations of the Idea of Man:—

Firstly, as an embodiment of Self-lawgiving Energies which issue as Will;

Secondly, as *conditioned* or *put together* with an external of other beings and things, and therefore as *willing* a Destiny of Society and Industry; and

Thirdly, as willing and determining the *Ends* involved with the Destiny of the Second Idea of Man, and therefore also with the Idea of the fundamental Spirit or Self-lawgiving Energies of the First—which Third Plate or Third Idea with explanatory Text will, however, constitute the Second Part of the work; the First and Second Plates or First and Second Ideas of Man being alone contained in the First.

A Phrenologist Amongst the Todas, or the Study of a Primitive Tribe in South India. History, Character, Customs, Religion, Infanticide, Polyandry, Language. By William E. Marshall, Lieutenant-Colonel of Her Majesty's Bengal Staff Corps. Permanent illustrations by the Autotype process. London: Longmans, Green, and Co. 1873.

This is a pleasant, and withal instructive, work, one that will be read with pleasure by the general reader, the phrenologist, and the ethnologist; its title, to a certain extent, developes its character, but the following statements extracted from its opening pages convey a good general idea of its contents.

In the course of a furlough (says Col. Marshall) I took in the year 1870 to the Madras sanatarium of Utacamand, in the Nilagiri mountains, commonly called "Ootacamund, in the Nilgherry hills," I heard much of an "aboriginal race" living in the neighbourhood; which, infanticidal and polyandrous, was said to be fast dying out.

I had long been curious to understand the mysterious process by which, as appears inevitable, savage tribes melt away when forced into prolonged contact with a superior civilisation. But, ignorant of all the languages of South India, I should have relinquished the attempt to study the Todas, had I not had the great good fortune to make the acquaintance of the Reverend Friedrich Metz, of the Bassel Missionary Society, who had spent upwards of twenty years in labours amongst the primitive tribes forming the inhabitants of the Nilagiris; and who, in addition to being skilled in several Dravidian dialects was exceptionally practised in High Kanarese and Tamil. Above all, he was the only European able to speak the obscure Toda tongue.

Mr. Metz most readily agreed to co-operate with me in strict inqury into the condition of the Todas, and henceforth became my sole associate in all expeditions amongst them—save one or two—and it is the more proper and just that I should in this place render Mr. Metz the warmest acknowledgment of the very disinterested and important share he had in the undertaking.

Our operations began with a census of a portion of the tribe, combined with an examination of each of the families that came before us. But in proportion as our work advanced, so did interest in the subject develop, until the scheme was entertained of enlarging the topic from its original design, so as to embrace "a study of the manners and customs of a primitive race of man."

With this evolution grew also the desire so to describe what I had seen, as to enable readers who could never have an opportunity of witnessing life amongst untutored races, to realise justly and without exaggeration, what it really is, and—by analogy—what it must have been in the pre-historic era, long ere "Adam delved and Eve spun," before man had much developed in manly qualities.

Whilst hoping, though not without some misgivings, that the ugly statistics collected with so much care, and the speculations advanced to account physiologically for the origin of obscure customs, may have some slight value, even to the *savant*, I am sanguine that the antique practices now brought to light, and the illustrations I have attempted of every-day life, may render the book acceptable to the general reader. I may say, that great and especial pains have been taken to render as large a portion of the work as the subject permits, attractive, and suited for ladies' reading.

A few words of explanation are perhaps called for; to account for my having devoted an entire chapter to the description of some of the first principles of phrenology—a subject which is fully treated in standard works by acknowledged authorities. I wished primarily to show the premises forming the basis for many conjectures which otherwise would have borne too much the appearance of dogmatism, or that might have been misunderstood. Secondly, I desire to show for phrenology, a marked practical value for ethnological purposes: and no single work containing, with clearness and brevity combined, so much information calculated to be serviceable to enquirers disposed to pursue the phrenologic mode of enquiry into the nature of barbarous races, which I have here faintly attempted; I trusted that the chapter might be useful, in some sort, as a manual for ethnographers so circumstanced.

But in this matter, as indeed throughout the book, I must trust very much to the lenient judgment of my readers; if, as a solitary Indian, far away from contact with men of science, but fresh from the actual and impressive presence of "nature's children," in attempting to work out for myself some of the vastly interesting unsolved problems of our day, I air some seemingly quaint ideas. The public is concerned simply in their truth.

Col. Marshall invites especial attention to the important contributions made by the eminent philologist and great Tamil scholar, the Rev. G. U. Pope, D.D., at present Head Master of the "Bishop Cotton" School at Bangalore.

Further on he acknowledges himself indebted to the Honourable Sir A. Arbuthnot, C.S., K.C.S.I., Secretary to the Government of Madras, for having placed at his disposal, the record existing in the Revenue Department, on the Subject of Toda infanticide.

In carrying out his views as above adverted to, Col. Marshall first gives an outline of the history of the Todas, then states his phrenological basis, the physiology of the Todas, their characteristics, the land they live in, their habitations, family arrangements, food, savage antitype, census, family statistics, religion and priesthood, their ideas as to the future state, funeral customs, infanticide, polyandry, and concludes with a description of the Toda language.

Although the book is one of considerable interest, it is difficult to extract any passage of a striking character, for the Todas, as a race, seem to be the most matter-of-fact, unambitious, and quiescent of men; leading what may be termed a pastoral life, in tending herds of buffaloes, which are quite sacred beings. Milking and butter-making appear to be the *summum bonum* of their existence; the dairyman and priest being one and the same person, and the village dairy the parish church of the Todas. It seems, however, that they have in their country some structures as mysterious as the Round Towers of Ireland, and that these are considered religious edifices. Perhaps the most amusing portion of the work is that in which Colonel Marshall narrates his night visit to one of these edifices, which consist of a conical thatched roof on a circular wall of very stout planking. The wall is about four cubits high, the whole edifice some fourteen or fifteen cubits tall, and six cubits in diameter. At a distance of approximately six cubits, the temple is surrounded by a massive wall of uncut stone, put together without cement, two cubits broad and three in height. The apex is crowned with a large stone, placed there apparently with the object—however inadequate the conception—of steadying the roof, or perhaps excluding rain from that weak point.

Selecting a dark night for the purpose, and accompanied by a friend, who, says Colonel Marshall, I had better at once state was not the reverend companion who has been my steady associate in all innocent, if somewhat inquisitorial visits—I walked over the hills on burglarious intent. What should I do, I thought, as I went along, if I really met a valuable relic, say some 2,000 years old, with an inscription on it? Who is it is said to have said that every man has his price? I had mine. Were I only to find a signet ring, I was ripe to commit theft in addition to the minor crime of breaking into a savage man's temple. The burglarious entry, as the Colonel relates it, appears to have been no mean feat of burglary, for the doorway was so low and narrow, that even taken anglewise it was found to constitute a close fit for full grown men. However, the inquirers both crawled in, and found the temple divided by a thick wooden partition wall, and a small doorway in this wall of the same dimensions as the first, and midway between the two doorways, at the level of the floor, a vat or basin of about half a cubit square, made of stone. We looked, says the Colonel, continuing his narrative, through the interstices of the clumsy slabs of the dividing wall into the next room. That, at any rate, is not empty. It is the *sanctum sanctorum* where the relics are kept. Once more! In through the little door of the dividing wall. Quite easy now! First squat square opposite to it like a frog, next supple the whole body, then go in cornerwise with *elan!* Don't attempt to rise till you are five feet off on the other side. This feat can be practised through a window frame on the ground level. Just looking round at the little door, more in sorrow than in anger, we proceed to business. Earthenware pots, honnus, and a whirl with which to churn butter by revolving between the palms of the hands. No bell, no hatchet, neither ring nor relic of any kind, no niche for lights, no altar, no stone, no phallus or lingum, no snakes! Everyone has been telling us lies, and the world is full of sawdust! Back through the two doors quickly like prairie dogs. Out into the open air. The transition was as if we had been born again. Now to philosophise. This is a very simple religious faith! How many negatives go to prove a positive. One thing is clear, every priest must be long in the back and very fond of milk! But why were the doors so unusually small, and why locked, and why these fusty lies about relics?

Subsequently our author was enlightened on this matter, upon remarking to a Toda man that the people of the village said there were relics in the temple. "Do they bury them in the ground?" He glanced sideways at his questioner, and by his countenance enjoined him silence. With his hand to the side of his mouth, he said in a low tone, "Under the stone on the top of the roof."

Milk, Typhoid Fever, and Sewage; a Series of Letters by Alfred Smee, F.R.S., F.C.S., Chairman of the Vegetable and Fruit Committee of the Horticultural Society; Medical Officer to the Bank of England. London: Printed by W. H. and L. Collingridge, 117 to 120, Aldersgate-street. 1873.

Notwithstanding the deservedly high estimation in which Mr. Smee is held as a chemist and medical practitioner, we are by no means prepared to endorse the wholesale condemnation of sewage grounds, which he enunciates in this little pamphlet, although we are quite ready to oppose the notion seemingly entertained by many sewage irrigators that too much sewage liquid cannot be applied to the land, for, doubtless, like many another chemical admixture, more liquid may be applied to the land or crops than it can readily absorb; but, because this may happen under improper management, to therefore conclude, as Mr. Smee appears to do, that sewage irrigation is too questionable as to sanitary harmlessness to render it an object of distrust to all true advocates of sanitary progress, is to us a *non sequitur*. So far we demur to Mr. Smee's views on this question; still, we believe that, taken *cum grano salis*, they are worthy of careful consideration. We therefore present our readers with the following extract, which will afford them a general notion of these views:—

A farm with sewage on it, and a sewage farm, must be held to be pestilential, death-producing swamps, until the sewage is disinfected. Nature should be followed, and manurial matters in the putrid state should be changed to mineral matters before they are absorbed by the plants which feed upon them. [Though how this is to effect the object in view is rather puzzling, seeing that Mr. Smee has previously told us that nitre in water condemns it for use, because the nitre, although at the moment utterly changed to chemical salts, *may have come from the nitrogen of previous sewage contamination*, p. 10.] Theoretically, earth disinfects the sewage. In practice, as now managed, part of the sewage never gets into the earth to be disinfected, as the whole is spread over the waterlogged ground, where it exhales its pestilential gases. Cows, whilst it is so spread over the field, drink some; blades of grass attach to themselves solid particles, and plants take up other particles in their juices. Notwithstanding this absurd deviation from the ways of nature, sewage farmers, engineers, speculators, and others living by the promotion of sewage farms, recommend sewage farms as now conducted as the source of all sanitary good. All men know that if we do not return to the ground that which we take from the ground the earth will not restore to us its usual crops. Sewage farm speculators assume that they alone know this great fact, and are always demonstrating it to draw off attention from the infraction of the laws of nature. If they return sewage to the land they care not in what state they apply it, and either do not know, or pretend not to know, the danger they incur. The gardener who makes up his hotbed sweetens his manure by fermentation, when ammonia is produced. The rootlets of his cucumbers and melons run in the manurial mass, and sweet and wholesome produce is obtained.

The gardener also uses liquid manure with care and caution in certain stages of the growth of a plant. He particularly abstains from giving the ripening strawberry such manure, as he knows that his fruit would be corrupted. The sewage irrigators, regardless of consequences, use putrid manure at such a period that the plants are dangerous to animals. They do not know, or they care not for the fact, that vegetable dyes, as madder, will permeate an animal and colour its bones, which demonstrates to all physiologists how animals are affected by the food they eat. Much more may be said upon the effect of sewage vegetation upon cows and sheep used afterwards for human food, which must be considered at a convenient season. Sewage promoters say that they can conduct their farms with safety to the community. Take them at their word, and if any complaints fairly arise from mismanagement, let the delinquent be fined £100 a day for every day a sewage farm is mismanaged.

Chemistianity (Popular Knowledge of Chemistry): a Poem; also an Oratorical Verse on each known chemical element in the universe, giving description, properties, sources, preparation, and chief uses. Arranged for familiar or memory reading. By J. CARRINGTON SELLARS, F.C.S. Published by the Author (at his Office), J. C. Sellars, Ferry-buildings, Birkenhead.

THIS is a work so unique that it is difficult to criticise it. The author essays, by the use of measured lines (or oratorical verses, as he terms them), such as may be readily read aloud in an elocutionary manner, to enable a student to obtain and retain a brief knowledge of chemistry, his notion being that this form of writing will be found more impressive than ordinary prose statements. That verse is more effective in its memory action than prose everyone will admit who calls to mind the fact that the juvenile poetry of good old Dr. Watts is perhaps more efficient mental pabulum than anything in our language.

There is no doubt that the verse is peculiar, and that the occasional use of newly invented words renders it still more remarkable; but, for all that, we incline to the opinion that the work will be likely to prove useful in the way which the author wishes it to be.

As a specimen of the contents of the book we offer the following to the notice of our readers:—

Crystals belong to one of six systems:
FIRST, or REGULAR SYSTEM, like Alum,
Common Salt, Iron Pyrites, or Fluor Spar.
SECOND, or QUADRATIC SYSTEM, like Tin
 Dioxide,
Or the Yellow Prussiate of Potash.
THIRD, or HEXAGONAL SYSTEM, like Quartz,
Calc Spar, or Ice as seen in Snow Crystals.
FOURTH, or RHOMBIC SYSTEM, like Native
 Sulphur,
Barium Sulphate, or Common Nitre.
FIFTH, or MONOCLINIC SYSTEM, like Borax,
Sodium Carbonate, or Cane Sugar.
SIXTH, or TRICLINIC SYSTEM, like Copper,
 Sulphate,
Boric Acid, or Potassium Bichromate.
The non-crystaline arrangement in Plants
And Animals is termed CELLULAR STRUCTURE.
Substances of no set shape are AMORPHOUS,
Such as Glass, Glue, or Silicate of Lead,
When the same body occurs crystalised.
In more than one system it is DIMORPHOUS.
Crystals from Native Sulphur and Sulphur
From Fusion are of two different systems.

The work is handsomely bound, is printed on good clear paper with new type made expressly for it, as it appears, and we cannot consider it as a production otherwise than creditable to author, printer, and publisher.

Elementary Treatise on Physics, Experimental and Applied. Translated and Edited from Garrot's Eléments de Physique. By E. ATKINSON, Ph.D., F.C.S., Professor of Experimental Science, Staff College, Sandhurst. Sixth Edition. London: Longman, Green, and Co. 1873.

THOUGH an old aphorism says that "Every dog has his day," we may also say that "Every scientific work has its day," the day with most of them being very short indeed, there being only a very small minority of works of which it may be said that their day extends considerably beyond the generation in which the work was first published; yet it may be fairly assumed that the day of this work is to be of indefinite length, for although its duration has up to the present been comparatively short, still, as will be seen, it has reached its sixth edition, and now sustains the same high character for merit which it received when first issued; for, although a translation from the French, there is not a work, to our knowledge, by an English author, which sustains so high a merit as this does; but in fairness it may be said this is partly owing to the able hands into which the translation has fallen. The present edition brings the text up to the latest discoveries in the various sciences into which the work is divided, and these comprise an addition of thirty pages of matter over the previous edition, the new matter referring to those subjects which are calculated to take a permanent place in elementary instruction. Three coloured plates, besides twenty-one other illustrations, are also added, and that portion of the work bearing upon Physiological Electricity has been carefully revised by Dr. Martin, of Cambridge.

We cordially recommend the present edition of this standard work to those interested in teaching, and also to the inquiring student, and we doubt not that as the former editions have always proved a source of pleasure and profit to them, so this last edition will be more so; we have not the least doubt, it will prove so by reason of the important addition referred to.

Workshop Receipts. For the Use of Manufacturers, Mechanics, and Scientific Amateurs. By ERNEST SPON. London: E. and F. N. Spon, Charing Cross, London.

UP to the present time any person seeking to find out a suitable receipt or formulary for a particular construction or process in any trade or handicraft, has been compelled to refer to various works bearing upon the particular branch of trade in question, and this search has often resulted in the mortification of finding no mention made of the subject. Beyond which it is not always convenient or practicable to obtain works where the desired information can be found. Therefore our thanks are specially due to Mr. E. Spon for compiling, in the form of a small book, an amount of practical information which will be vainly sought for in many ponderous tomes. In glancing through this work we have been convinced that the various processes, &c., have been taken from the best authorities, and that the task ot compilation has fallen into able hands. The preface states that the work has been written to effect three purposes—to serve as a note-book for the small manufacturer, to supply the intelligent workman with information required to conduct a process foreign, perhaps, to his habitual labour, and impart to the scientific amateur a knowledge of many processes in the arts, trades, and manufactures, and we think that not only to these classes of individuals will the work be specially interesting, but to others who do not come within the classes above mentioned, for there are some of the receipts or processes in this work which would prove of great service to the housewife. It is not a work where we can give extracts of the different portions of the work, as it is of that character where one portion is of equal merit with the rest, although in saying this we should state that we think there are some receipts or processes which would have been as well to have left out, but these form a very minute portion of the work, and do not in any way lower the character of the book in the excellence of its information, and for this reason we recommend it to all those who have anything to do with processes or technical receipts of various kinds.

SCIENCE SIMPLIFIED.

Reviews of Treatises on "Light," embracing Reflection and Refraction of Light, Light and Colour, Spectrum Analysis, the Human Eye, and Polarised Light. By J. H. PEPPER, late Professor of Chemistry and Honorary Director of the Royal Polytechnic Institution. London: Frederick Warne and Co, Bedford street.

"Heat," embracing Thermometric Heat, Conduction of Heat, Latent Heat, Steam. Same author.

"Pneumatics and Acoustics," "Chemistry," "Electricity," "Magnetism."

THE whole of the above books seem to be parts of the "Science Encyclopædia" published by Professor Pepper some few years ago, when he was Professor at the Polytechnic, and the works before us are, as far as we can judge, a bringing together of the various interesting experiments, novel and otherwise, which were brought before the public during the time of his Directorship of that institution, proving a source of instructive amusement to those who witnessed them. We think, however, that they cannot be considered as *par excellence* class books or text-books for students who may be studying one or all of the above mentioned branches of science. But to a certain class of readers these works will be acceptable, though to those who are aspiring to obtain a systematic knowledge of these different branches of science, we are of opinion they will not be of any great value. The class to whom they will be particularly useful is that of popular lecturers, whose aim is not so much to teach these various branches of science in a technical way as to convey general scientific information and afford amusement to an unscientific audience, by which term we mean an audience not assembled as scientific students, but who have come to obtain information in an amusing way. Hence, in our opinion, to that class especially they will be welcome, and in this sense we deem them works worthy of commendation.

Perhaps, after all, looking at the fact that nearly every enterprising publisher now-a-days brings before the world a series of elementary books in science, it is well that Professor Pepper has presented us with something of a different character.

Manuel Pratique de Procedure Anglaise, et Recueil de Lois à l'Usage des Francais et des Belges, dans leurs Relations d'Affairs avec l'Angleterre. Par JOHN RAND BAILEY (8, Tokenhouse-yard, Londres), "Attorney" près les Cours de Common law et "Solicitor" près la haute Cour de Chancery de l'Angleterre. Londres: Hachette et Cie., 18, King William-street, Strand. Paris: Cosse, Marchal, et Billard, 27, place Dauphine.

THIS little work, by a practising attorney, is in every sense what it professes to be—a practical handbook of English legal procedure, and we can highly recommend it to foreigners, to whom it cannot fail to be of the utmost service, whenever it may be necessary for them to take or defend legal proceedings in England. Such a treatise was much required, and will greatly facilitate commercial and general intercourse between French-speaking countries and England.

Information is supplied under separate heads for most cases in which foreigners usually require a knowledge of English law, including the law of debtor and creditor, bankruptcy, liquidations, joint stock companies, patent for inventions, literary and artistic copyright, naturalization, wills, extradition, &c., &c. At the end of each chapter are practical instructions as to the steps and proceedings necessary in each case, together with a collection of valuable forms.

"Student's Class-Book of Astronomy." By Francis Bullock, LL.D. (Relfe Brothers.)
"First Book of Geology." By William T. Davis, LL.D. (Collins and Sons.)
"An Easy Introduction to Chemistry." Edited by the Rev. Arthur Rigg, M A. (Rivingtons.)

We notice the issue from the press of the above Science School Books.

TOLSON'S LIFE SAVING BUOY-VESSEL.

THIS very ingenious device comprises the use of a watertight vessel, the lower part of which is hemispherical, and the upper part conical, or nearly conical, the figure of the whole being that of an inverted balloon or pear. This vessel is made of copper or other material, combining lightness with strength. The lower, or hemispherical, part is provided with a close fitting casing or covering of cork, or other buoyant material, and the said casing may terminate at the top in a flange or broad belt of cork or other buoyant material, though the inventor does not recommend this, but uses in lieu thereof a flange or girder-like projection of metal, shaped like a V, or nearly so, and of width sufficient to enable a man in tolerably calm weather to stand upon it and hold it by a guide rope, which will be rove around the vessel, underneath the entrance, and from which point signals may be given, lights displayed, and so forth. Different coloured lights, likewise, can be arranged as fixtures for night use, so that the appliance can be seen by passing ships.

In the interior of the said hemispherical part is a floor, having upon it a number of seats. Underneath the floor is a space for ballast or merchandise, and the seats for passengers also serve as water tanks and lockers for provisions. Leather belts are attached to the seats for the purpose of securing the passengers. In the upper or conical part of the vessel is a series of narrow panes of thick glass, for the purpose of admitting light, and about midway up the said conical part is a door capable of being opened, closed, and fastened, in the inside. This door is for the introduction of passengers, food, and other articles. The conical upper part of the vessel terminates in an open pipe or neck of small diameter. At the base or the neck is a grating having on its top a cap which can be raised or lowered. By raising this cap, a flag may be passed through the top of the vessel, and by means of a double action pump, air can be pumped in and water pumped out. If necessary the air can be admitted to, and made to circulate through, the vessel by means of pipes entering into the vessel near its top, and descending along the inner sides of the vessel to its lower part, the same pipes opening below the seats of the passengers. The upper external ends of the air pipes are turned down some distance on the outside of the conical part of the vessel. The door is also furnished with a grating for the admission of air, such grating forming the side of a flat box inserted in the door. Air enters the flat box by means of a hole in its front, any water passing in with the air escaping by a series of short pipes near the lower edge of the box. A similar arrangement may be employed at the outer end of each air tube for the purpose of securing a supply of air from which water or spray has been separated. In using the apparatus persons, property, and provisions are introduced by the door, which is fastened from the inside. On the sinking of the ship, the apparatus floats, and from its construction rights itself in whatever position it may be thrown, by the action of the waves or other causes. Or the apparatus containing its charge may be lowered from the side of the ship into the water. The inventor states that when desired, he can use a cutwater and also means of steering and propelling.

The inventor and patentee of this invention is Mr. Thomas George Tolson, of Birmingham.

SKINNER'S RAILWAY ACCIDENT PREVENTER.

THIS is an invention well worthy the attention of railway authorities, for, as far as we can form a judgment from descriptions and models, its use would materially lessen the number of railway casualties. In his final specification just filed, Mr. Skinner thus describes his invention—My invention consists of certain arrangements of wires, rods, levers, catches, bars, and inclined planes, whereby I obtain a better mode of communication than any hitherto adopted, whether as fog, distance, or danger signals, and for this purpose I make a certain arrangement of wires, rods, levers, catches, bars, and inclined planes which can be actuated by either station porter or other official at any railway station where a train may be stopping or otherwise, and, if required, I can cause certain moveable parts of my invention to be actuated by hydraulic pressure, my object being to enable officials at any railway station, at any distance, to turn on the steam whistle of any engine approaching the station; and also to enable the officials, if they deem it necessary, to shut of the steam of any engine approaching the station; and I also use certain inclined planes which are fixed outside or inside the line of rails—which inclined planes can be made permanent, if necessary, so that they are beyond the tampering of any official connected with the line. I also have attached to the engine a pendant, which can be actuated by the aforesaid inclined planes so that it may be used for shutting off the steam or blowing the engine whistle, as may be required, to give the engine-driver notice of his position when approaching the station or any other part of the line.

For the fog or distance signal, I use certain inclined planes which I fix near to, or on the side of, the line at given distances from the station or other pre-determined part. On the engine I fix a certain shaped lever or pendant, the lower end of which is made to suit the curve of the incline. The upper end of this lever or pendant has a rod or wire connected with the steam whistle. As the engine passes the incline the lower end of the lever or pendant is brought in contact with the aforesaid incline, thereby giving motion to the upper end of the said lever or pendant, which causes the steam whistle on the engine to sound.

When used as a danger signal a similarly shaped incline is fixed on the opposite side of the line, which incline is made to rise and fall by a communication from the station or other point on the railway, that the train is approaching. This is effected by means of a wire or rod which is attached to a lever at the railway station or other point. When these danger signals are required to be worked at a great distance from a station or point on the line, hydraulic power will be necessary in order to enable a station-master or other official to stop a train as it is approaching, for which purpose he will have to pull a lever which at once causes the aforesaid incline to rise. The lever, or pendant, is attached to the engine, as before described, and its upper end is connected to the steam shut-off. This lever, or pendant, as the engine approaches comes in contact with the aforesaid incline, when the steam is at once shut off.

HOUGH'S SHIPS' LIFE BOATS.

THIS promising invention, some description of which we recently gave, and intend to further describe and give an illustration of, is attracting considerable attention. Mr. E. Hough, of 15, Tower hill, is the inventor.

CARMICHAEL'S ANTI-WAVE MOTION SHIPS.

THE objects of this invention are to so construct ships and vessels that the prejudicial effects of the waves thereon shall be quelled, so that persons travelling in them shall not be liable to sea-sickness, and, further, that such vessels shall be improved as regards the propulsion of them. The inventor constructs the vessel with a sloping roof, or part of one rising from the surface of the water, or near it, on which the waves may gradually lose their force, as on the slope of a breakwater, instead of rushing against perpendicular sides, and sometimes sweeping the deck. He also provides a clear passage above that roof for the more furious waves to pass from windward to leeward, with a small deck above that open space. The inventor also uses a cylindrical tube, or tubes, extending from stem to stern within the vessel, from one to eight or more feet in diameter, according to the size of the vessel, within, or immediately behind which the screw propeller may rotate. To lessen the friction of the water the inside of the tube should be quite smooth, and the fore-part about a tenth narrower than the stern part. By adopting this arrangement the inventor says the water reaches the screw or propeller directly instead of obliquely, and the stern may thus be made broader than usual in screw-vessels, and should it be found that the screw or propeller can work with advantage within the tube it will then be free from storms and torpedoes, and it is likely that so much power will not be lost by the slip of the screw. The pitch should be small, and the diameter nearly as broad as the tube. A grating is to be used at the bow to prevent solid substances passing therein. The heavier parts of the vessel are to be on the outside, and moveable weights for balancing are to be provided. But the details of these arrangements can be varied to suit the requirements of the case. Sometimes the inventor uses the following modification. He constructs the greater part of the sloping roof or bulwark in the form of moveable panels to be pushed on in rough weather, so as to cover the open space over the ordinary deck, same to be moveable only when the force of the waves is nearly expended, which may be at about 8 or 10 feet above the surface of the sea. The bulwark at the prow the inventor considers should be permanently fixed, and he proposes to term his ship the *Breakwater* steamer, the action of his improvements being that of a breakwater In the specification of his patent various other improvements in subsidiary details are described, and the invention is illustrated by appropriate drawings which accompany that document.

The inventor and patentee is Dr. W. S. Carmichael, of Annandale-street, Edinburgh, whose name will be familiar to our readers as an occasional contributor of interesting matter to this journal.

MODERN LOCOMOTIVES.

MR. JOHN ROBINSON, M. Inst. C. E., of Manchester, read the following paper at the meeting of the Institution of Civil Engineers, 11th November instant. He first stated that, in the present day, with a view to lessen the capital expenditure on railways, engineers had been compelled to follow more closely the contour of the country, both as regarded the vertical profile and the general direction of valleys and hills, the consequence being severe gradients, often concurring with curves of small radius. This fact, taken in conjunction with the circumstance that, in the colonies and in less developed districts, high speeds and frequent communication were not necessary, had led to the employment of heavy engines for the purpose of gaining great tractive power, since load rather than speed was the desideratum. A like state of things existed in most parts of the continent of Europe, where heavy and slow trains, both of passengers and goods, were the rule; thus permitting the service to be carried on at a much lower rate per ton per mile than the rapid traffic of Great Britain rendered possible. Of late years the passenger traffic had so increased in the United Kingdom, that even express trains were now worked, for the most part, with coupled engines, the additional points of contact with the rails being imperative, in order to prevent slipping, and to afford greater facility in starting. Increase in the size of engines had everywhere been found to be a necessity; and while the outside frames of inside cylinder engines had been generally abandoned, the inside cylinder arrangement had been almost universally adopted, notwithstanding the disadvantage it presented of a cranked driving axle. The details of construction of different types of engines, and their adaptation to the work required, were then described. Attention was first directed to the Great Northern Railway express engine, in which outside cylinders had been resumed, perhaps as a necessary consequence of the adoption of a bogie frame with four wheels, instead of a pair of leading wheels, to ensure greater freedom in passing round curves at high speeds. The cylinders were 18 inches in diameter, with a length of stroke of 28 inches—a size, it was believed, never before attempted for passenger engines in this country. The small ends of the connecting rods were furnished with solid bushes of gun metal, and had run more than 50,000 miles without renewal. The inner and the outer fire-boxes were connected together by stays, screwed into each of the plates without the intervention of iron girder bars. By this arrangement, which had been in use for some time in Belgium, the large amount of deposit generally existing upon girder boxes was prevented, the facility for cleansing was much greater, and the liability of the tube holes in the copper plate to become oval had been got rid of. The heating surface in this engine was, in the tubes 1,043, and in the fire-box 122 square feet. The fire-grate had an area of 17.6 square feet. When the engine was in working order, the weights upon the driving and hind wheels, and upon the bogie, were 15, 8, and 15 tons respectively. The distance from the centre of the hind wheels to the centre of the bogie pin was 19 feet 5 inches. This engine was capable of drawing a weight of 356 tons on a level at a speed of 45 miles an hour, with a working pressure of 140 lbs. to the square inch. The consumption of coal, with trains averaging sixteen carriages of 10 tons weight each, had been 27lbs. per mile, including getting-up steam and piloting. The cost of maintaining and renewing passenger engines on the Great Northern Railway was estimated to amount to 2½d. per mile. The next example selected was the London and North-Western Railway fast passenger engine. In this case the cylinders were inside between the frames, in the smoke-box in fact, and had a diameter of 17 inches, with a length of stroke of 24 inches. The boiler was fed by two Giffard injectors, placed vertically behind the fire-box. The admission of water to the injector was regulated by a screw with a wheel handle. The water ascended and passed through a clack box (that could be closed at pleasure) into the boiler, along an internal pipe, carried forward two-thirds of the length of the barrel of the boiler. All external pipes running forward outside the boiler were thus done away with, and greater simplicity and freedom from accidents were secured. The heating surface in this engine was 1,013 square feet in the tubes and 89 square feet in the fire-box. The area of the fire-grate was 15 square feet. The distribution of weight on the wheels, when the engine was in working order, was 9 tons 9 cwt., 11 tons, and 8 tons 15 cwt. on the leading, driving, and trailing axles respectively. The total wheel base was 15 feet 8 inches. This engine could draw a load of 293 tons on a level at a speed of 45 miles an hour, with a working pressure of 120 lbs. to the square inch. The consumption of coal per mile was 26·3 lbs., with trains averaging ten carriages; and the cost of repairs, over a period of six years and a half, had been 0·52 of a penny per mile run. The six-wheeled coupled goods engine made for the Great Southern and Western Railway of Ireland, and consequently suited to a gauge of 5 feet 3 inches, was next described. In this case the cylinders were 17 inches in diameter, with a length of stroke of 24 inches. The tires of the wheels and the axles were of cast steel. The coupling-rod ends were furnished with cast-iron bushes, lined with white metal. The small ends of the connecting rods had wrought-iron steps, case-hardened. Sand boxes were fixed in the smoke box, and a steam break was applied. The heating surface in the tubes was 846 and in the fire-box 93 square feet. The fire-grate had an area of 17½ square feet. The weights upon the leading, driving, and trailing wheels were 10 tons 12 cwt., 11 tons 7 cwt., and 8 tons 15 cwt. respectively. The total wheel base was 15 feet 6 inches. This engine could draw a load of 607 tons on a level at a speed of 25 miles an hour, with a working pressure of 140 lbs. to the square inch. The average consumption of coal was 35 lbs. per mile with a load of fifty-five waggons. The cost of repairs had been 0·63d. per mile. The next engine referred to had been specially designed for the heavy goods traffic on the Bombay, Baroda and Central India Railway, where the gauge—5 feet 6 inches—had afforded great facilities for the construction of a powerful machine on a reasonable length of wheel base. The cylinders were 18 inches in diameter, with a stroke of 24 inches. The escape of smoke, when the engine was standing still, was prevented by the application of Mr. D. K. Clark's apparatus, for the introduction of air above the surface of the fire. There were 1,278 square feet of heating surface in the tubes and 99 square feet in the fire-box. The area of the fire-grate was 25½ square feet. This engine could draw a load of 694 tons on a level at a speed of 25 miles an hour, with a working pressure of 140 lbs. The consumption of coal was 59¼ lbs. per mile for an average load of 490 tons. The cost of repairs had been 3·22d. per mile. A peculiar feature of this engine was the position of the hind axle under the fire-box, permitted by the shallowness of the end of the latter. This arrangement answered the double purpose of allowing a comparatively short wheel base and an equal distribution of the weight of the engine upon the wheels,—11 tons, 11 tons 16 cwt., and 11 tons 16 cwt, being carried on the leading, the trailing, and the driving wheels respectively. The locomotive next described was of the class usually called "tank engine," and was constructed for the conveyance of mineral or heavy goods traffic over a portion of the Furness railways, having gradients of 1 in 100, 1 in 80, &c., for 11 miles. This engine was designed to obtain as much power as was possible upon six wheels. The frames had been put inside the wheels, to allow convenient access to the motive parts; the cylinders being placed inside, to secure a great structural stability. The cylinders were 18 inches diameter, with a stroke of 44 inches. Tanks, to contain 1,000 gallons of water, were arranged along each side of the smoke-box, the boiler, and the fire-box, above the level of the frame, so as to distribute equal weights upon the wheels, which, when the engine was in working order, and the tanks were full, were 13 tons 16 cwt., 14 tons 11 cwt., and 13 tons 8 cwt., on the leading, driving, and trailing wheels respectively. The total wheel base was 15 feet. The heating surface in the tubes was 1041, and in the fire-box 96 square feet. The area of the fire-grate was 15 square feet. The engine could draw a weight of 872 tons on a level at a speed of 20 miles an hour, and a weight of 367 tons up the incline of 1 in 80 at a speed of 11¾ miles an hour, with a working pressure of 145 lbs. to the square inch. The consumption of fuel with this latter load had been 40·16 lbs. per mile For engines with rigid frames, a simple and convenient arrangement had recently been applied, in the shape of a sliding top to the leading, and sometimes to the trailing, axle-boxes. This cap had a double incline in the transverse direction of the engine. The axle-box had also similar corresponding inclines, so that when passing round a curve the leading wheels were free to move sideways, without at once carrying the engine with them. This plan had been largely adopted on the Midland Railway, Details were then furnished of the Fairlie system of locomotives, designed with the object of giving extreme freedom of movement to the engine and wheels, while securing sufficient stability to the boilers and their adjuncts. It had likewise been sought to utilise the whole weight of the fuel and water for the purpose of tractive adhesion. In conclusion, the author alluded to the great advantages which had accrued to the users of locomotive engines, by the adoption of steel instead of iron for many parts, especially for tires and axles, whether the latter were cranked or straight. It was announced that the discussion, which had been commenced, would be resumed at the next meeting of the society.

The Scientific and Literary Review

Is published at the
OFFICES, 21, COCKSPUR STREET, CHARING CROSS.
LONDON, S.W.,

On the 1st of every Month, and sent post free on prepayment of the ANNUAL SUBSCRIPTION OF 6s. 6d.; or it may be had, by order, from Messrs. KENT AND CO., PATERNOSTER ROW, or any Bookseller or Newsagent in the kingdom, *price 6d. per copy.*

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Editor's Office: 21, Cockspur Street, Charing Cross, S.W.

THE INVENTORS' INSTITUTE,

4, ST. MARTIN'S PLACE, TRAFALGAR SQUARE, LONDON.
ESTABLISHED 1ST MAY, 1862.

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Chairman of the Council: SIR ANTONIO BRADY.

NOTICES.—SESSION 1873-4.

THURSDAY, DEC 11TH.—On "Prevention of Railway Accidents by Automatic Railway Couplings." By W. GADD, Esq., C.E., at 8 p.m.

TO MEMBERS OF COUNCIL.

Council meeting to take place at 7 p.m. on same evening.

Subscriptions are payable to Mr. G. A. STRETTON, the Receiver, 4, St. Martin's-place, S.W., who is the proper official to give receipts.

F. W. CAMPIN, Sec.

Proceedings of the Institute.

At the first members' meeting, held at 4, St. Martin's-place, Trafalgar-square, Mr. HUME WILLIAMS, Barrister-at-Law, Vice-Chairman of the Council, in the unavoidable absence of Sir ANTONIO BRADY, Chairman, presided, and delivered the opening address of the Session 1873-4, which is given as the first article of the present number of this journal.

Upon the conclusion of the address, the Secretary (Mr. CAMPIN) stated that the following business had been arranged for, namely, on 27th Nov., E. R. Southby, Esq., on Economic Gas Cooking Apparatus; 11th Dec., W. Gadd, Esq., C.E., on the Prevention of Railway Accidents, by the use of improved railway couplings. After Christmas conferences on the Patent Laws would be held, the precise date of which would be stated in the journal (SCIENTIFIC AND LITERARY REVIEW).

Several remarks were then made by the following members:—Mr. F. H. VARLEY (Chairman of Ordinary Council or Executive of the Institute), Mr. TOOTH, Mr. MACCOMBER, Mr. DAVIS, Mr. COOMBE, and had reference to the Vienna Congress on Compulsory Licenses, which they objected to, unless restricted to cases where the patentee failed to supply the public demand. At the conclusion of this discussion a vote of thanks to Mr. Williams, the Chairman of the evening, was passed by acclamation.

At the Council meeting (special and ordinary) preceding the above members' meeting—Mr. H. WILLIAMS, Vice-Chairman of the Council, in the chair—after the minutes of the last meeting had been read and confirmed as being correctly entered—no question having been raised on the resolutions passed by intervening ordinary Councils—the Secretary reported that the question of the position to be taken by the Institute with regard to the Society for the Promotion of Scientific Industry at Manchester had to be dealt with, and that the last ordinary Council had recommended a conference to be solicited; but it had been thought that before taking any action the opinion of the full (special) Council should be taken; thereupon it was resolved that such a conference is desirable.

The CHAIRMAN introduced the question of the desirability of the Institute instituting the award of a medal for a meritorious invention, which was generally acquiesced in, but the subject was considered worthy of further consideration, and was ordered to stand over for further discussion.

The usual communication from the Treasury Committee was made, and several gentlemen admitted as members—were ordered to be placed on the list of members—and Mr. Cromwell Varley was especially proposed and elected a member.

Monthly Notices.

Obituary.—We have to perform the melancholy duty of recording the death of Mr. J. J. Russell, well-known in connection with improved tube making.—Also the decease of Robert John Le Mesurier M'Clure, the discover of a North-West Passage, who was born in 1807, and entered the navy at an early age, serving as a mate on board H.M.S. *Terror*, under Sir George Back, when that veteran Arctic explorer attempted to reach Repulse Bay. M'Clure was then promoted to the rank of lieutenant, and was on the Canadian lakes during the rebellion of 1838. While on this service he performed an act of audacious gallantry, which involved a violation of United States territory. From 1842 to 1846 he commanded the Romney receiving ship at the Havanna, and during 1847 he was in the Coast Guard. When an expedition in search of Sir John Franklin, in 1848, was determined on, M'Clure saw a field for his adventurous spirit, and volunteered for the service. He was appointed first lieutenant of H.M.S. *Enterprise*, under Sir James Ross; and passed the winter of 1848-49 at Port Leopold, returning in the autumn of the latter year. It was at once determined to re-equip the vessels, in order to resume the search for Franklin's missing ships by way of Behring Strait. Captain Collinson was appointed to the *Enterprise*, as senior officer, and M'Clure, who had been promoted to the rank of commander during his absence, took command of the *Investigator*. The story of M'Clure's memorable voyage has been well told by Admiral Sherard Osborn, in a work "Discovery of a North-West Passage." It was on the morning of October 26th, 1850, that Robert M'Clure, standing on a lofty hill on Bank's Land, sighted Barrow Strait and the coast of Melville Island beyond, and thus became the discoverer of the North-West Passage. All doubt as to the existence of a water communication between the two great oceans was removed. The hill was called "Mount Observation." The next year M'Clure performed, probably, the most wonderful feat of ice navigation on record, passing round the south and west sides of Bank's Land, between the shore and the stupendous ice-fields of that inland sea, until he reached the bay of God's Mercy, on the northern coast. The two winters passed in this cheerless spot well-nigh exhausted the provisions, and M'Clure had made all his preparations for abandoning the ship, when, on the 6th of April, 1852, a party from the *Resolute* came to his relief. The comparatively short march from the Bay of Mercy to the *Resolute's* position off Melville Island completed the North-West passage; and M'Clure and his "Investigators" are the only men who have ever passed from ocean to ocean round the northern side of North America. Sir Robert M'Clure afterwards did excellent service during the China war. The funeral took place at Kensal Green cemetery on the 25th Oct., when many brother Arctic explorers assembled round his grave.—Dr. F. Crace Calvert, F.R.S., well known for his various chemical investigations, and whose name is especially connected with the Carbolic Acid manufacture, died on the 24th of October, at Clayton Vale House, near Manchester.

L'Institut prints a very valuable memoir, by M. Walthère Spring, read on the 5th of July last, before the Académie Royale de Belgique, "Composés Oxygénés du Soufre." Also another chemical paper, by Prof. Théodore Swartz, of the University of Ghent, on the "Acides Pyro-citriques." Both these memoirs are important additions to our chemical knowledge.

Ship's Movements.—A series of methodical observations on the various movements of a ship affected by waves was carried out, says the *Times*, on board the ship *Norfolk*, during her last voyage from Melbourne to London. These observations appear to have been made with self-registering instruments, devised by Mr. Spencer Deverell, of Portland, Victoria, who is known to have devoted much time and study to the investigation of the movements of ocean waves, and to their action upon floating bodies.

Lithium in Plants.—From some recent observations by Herr Focke, it appears that lithium is essential to the nutrition of certain plants, such as several species of Thalictrum. The presence of lithium in many plants had previously been recognized, but it was considered to be an unessential element in their constitution.

Post-Glacial Drifts in Ireland.—A sketch of the palæontology of the post-glacial drifts of Ireland has been given in the *Geological Magazine*, by Mr. A. Bell, who has for some time past been engaged in studying the upper tertiary and post-tertiary fossils of the British Isles.

Cultivation of Cinchonas.—According to the *Pharmaceutical Journal*, the cultivation of the cinchona plant is being successfully prosecuted in Java. Considering the great value and the prevailing scarcity of quinine, any attempt to extend the cultivation of cinchonas should be watched with general interest. The barks from the Java plantations are said to yield a high per centage of alkaloids, and thus promise to become a valuable source of the drug.

Interesting Balloon Discoveries.—Some meteorological observations during a balloon ascent have recently been made by M. G. Tissandier. One of the interesting features of the voyage lies in the observations made by the aeronauts on the existence of two atmospheric currents at different altitudes, moving in different directions, and with different velocities. Whilst the lower current was moving at the rate of only six or seven kilomètres per hour, the upper current was found to have a velocity of thirty-five kilomètres per hour.

New Planet.—The last new planet, discovered by Dr. Luther at Bilk, near Düsseldorf, on September 27, has received the name Sophrosyne. The planetary discoveries of that astronomer have been almost continuous since 1852, when he discovered Thetis on April 17.

HOOPER'S TELEGRAPH CABLE SHIP.

THE *Hooper* is the first vessel ever built specially for the purpose of laying cables, and the success which has attended her first voyage fully justifies the anticipations of those by whom she was designed. She is a very large vessel—the largest, after the *Great Eastern* ever built—being over 5,000 tons register. Three enormous cable tanks form a part of her structural design, and therefore, instead of being a source of weakness, as in all vessels merely adapted for this peculiar work, they add considerably to its strength; while their capacity is said to be 5,000 cubic feet in excess of the superstructural tanks of the *Great Eastern*. She is 320 feet long between perpendiculars, 56 feet beam, with 35 feet depth of hold, and a model of admirable construction, and of the application of every scientific labour-saving appliance; while her paying-out and picking-up machinery, being of the very latest construction, embodies every improvement that the most recent experience in deep-sea telegraphy has suggested. The *Hooper* is remarkable in another respect, for, though the second largest in point of size ever built, she is, perhaps, unique for the rapidity with which she was turned out of the builder's hands. In six months from the time of her keel being laid, she was delivered to her owners, and was taking in the first section of a cable which is to connect all the Brazilian ports north with the West Indies, and south with the River Plate. Starting from Plymouth on the 22nd of June last, she went out and laid 1,400 knots of cable between Pernambuco and Para, and was back again in the Millwall Docks on the 4th of October. She has now almost completed taking in a second instalment of 1,600 knots, which will be laid from Pernambuco to Bahia and Rio Janeiro. The vessel will start early next week, and, if all goes well, will complete her task before the close of the year. To celebrate the successful completion of the first portion of her work, a number of the directors and friends of the Hooper Telegraph and of the Western and Brazilian Telegraph Companies met recently on board, and, after inspecting the good ship and the works close adjoining, from which the cable is paid directly into the tanks, lunched together, under the presidency of Mr. Hooper, the managing director of the former body.

Proceedings of Societies.

THE INSTITUTION OF CIVIL ENGINEERS.

The subjects for papers in the Session 1873-74 comprise the following list; and others are invited on such questions as—Account of the Progress of any Work in Civil Engineering, as far as absolutely executed (Smeaton's Narrative of the Building of the Eddystone Lighthouse may be taken as an example); Descriptions of distinct classes of Engines and Machines of various kinds; Practical Essays on Subjects allied to Engineering, as for instance, Metallurgy; and Particulars of Experiments and Observations connected with Engineering Science and Practice.

The following is an abbreviated list:—1. Application of Graphic Methods in the Solution of Engineering Problems, and in the Reduction of Experimental Observations; 2. Elasticity, or Resistance to Deflection, of Masonry, Brickwork, and Concrete; 3. Use of Concrete, or Béton, in large masses, for Harbour Works and for Monolithic Structures; 4. Manufacture of Iron and Steel as now practised; 5. Results of Experience in the recent Extended Use of Steel in Mechanism and in works of Engineering; 6. Theory and Practical Design of Retaining Walls; 7. Modern Methods of Constructing the Foundations of Bridges, and on Bridges of Large Span; 8. On the different Systems of Swing, Lifting, and other Opening Bridges; 9. Lock Gates; 10. Rock-boring and Blasting; 11. Signaling on Railways; 12. Constant Service of Water Supply, with special reference to its introduction into the Metropolis, in substitution for the Intermittent System; and on the waste of Water, and the best apparatus for its prevention; 13. Modes of Dealing with Sewage; 14. Separate System of Sewering Towns; 15. Ventilation of Sewers; 16. Relative Value of Upland and Tidal Waters in maintaining rivers, estuaries, and harbours; 17. Construction of Sluices; 18. Maintenance, by Sluicing, of the Harbours on the Coast of France, Belgium, and Holland; 19. Sea Works at the mouths of the Rivers Adour and Maas; 20. Recent Improvements in the Construction of Steam Boilers adapted for very High Pressures; 21. Best practical Use of Steam in Steam Engines, and on the effects of the various modes of producing Condensation; 22. Construction of Marine Engines; 23. Modern Locomotive Engines; 24. Application of Steam as a Motive Power for Pumping Water or Sewage; 25. Pumps employed for Raising Water or Sewage, and their relative efficiency; and on the employment of Water as a Motive Power for pumping, by means of Water-Wheels, Turbines, Water-Pressure Engines, or other machines; 26. Employment of Steam power in Agriculture; 27. Methods of transmitting Force to distant points, and on the Details of the existing systems of Rope transmission; 28. Present State of Science in regard to the Manufacture of Gas for Illumination; and on the Materials most suitable for the purpose; 29. Manufacture of Mineral Oils, and the Lamps best adapted for their consumption in dwellings and lighthouses; 30. "Output" of Coal in the United Kingdom, as compared with that of other countries, illustrated by statistical tables, plans, and diagrams, showing where Coal is produced, and where and how it is consumed; 31. Mechanical Apparatus at present in use in "getting" Coal; 32. Modifications necessary in future Coal Mining Operations; 33. On Turf, or Peat, Cutting, Macerating, and Pressing Machinery, with experiments as to its heating power and expense as a Fuel, as compared with Coal; 34. Methods of Draining distant isolated sections of Mines; 35. Compressed Air as a Motive Power for Machinery in Mines, with some account of its application on the Continent; 36. Use of Diving Apparatus in mines, especially in Westphalia and in Germany.

For approved Original Communications, the Council state they will be prepared to award the Premiums arising out of special Funds devoted for the purpose.

Papers which have been read at the Meetings of other Societies, or have been published in any form, cannot be read at a Meeting of the Institution, nor be admitted to competition for the Premiums.

The communications must be forwarded, on or before the 31st of January, 1874, to the house of the Institution, No. 25, Great George-street, Westminster, S.W., where any further information may be obtained. The notification is signed by Charles Manby, *Honorary Secretary*, and James Forrest, *Secretary*.

The following premiums were awarded during the Session of 1872—73:—1. A Watt Medal, and a Telford Premium, in Books, to Sir Charles Augustus Hartley, M. Inst. C.E., for his Paper on "The Delta of the Danube, and the Provisional Works executed at the Sulina Mouth;" 2. A Telford Medal and a Telford Premium, in Books, to James Deas, M. Inst. C.E., for his Memoir on "The River Clyde;" 3. A Watt Medal, and a Telford Premium, in Books, to John Head, Assoc. Inst. C.E., for his Paper on "The rise and progress of Steam Locomotion on Common Roads;" 4. A Watt Medal, and a Telford Premium, in Books, to William Anderson, M. Inst. C.E, for his Description of "The Aba-el-Wakf Sugar Factory, Upper Egypt;" 5. A Telford Medal, and a Telford Premium, in Books, to William Thomas Thornton, C.B., for his Essay on "The relative advantages of the 5 feet 6 inches Gauge, and of the Metre Gauge for State Railways of India;" 6. A Telford Medal, and a Telford Premium, in Books, to Colonel William Henry Greathed, C.B., R.E., for his "Account of the practice and results of Irrigation in Northern India;" 7. A Telford Premium, in Books, to John Milroy, Assoc. Inst. C.E., for his Paper on "Cylindrical or Columnar Foundations in Concrete, Brickwork and Stonework;" 8. A Telford Premium, in Books, to William Pole, LL.D., F.R.S., M. Inst. C.E., for his "Notes on the Rigi Railway;" 9. The Manby Premium, in Books, to Thomas Sopwith, Jun., M. Inst. C.E., for his Paper on "The Mont Cenis Tunnel."

The Council have likewise awarded the following Prizes to Students of the Institution:—1. A Miller Prize to Frank Salter, B. Sc., Stud. Inst. C.E., for his Paper on "Economy in the use of Steam;" 2. A Miller Prize to John Newman, Stud. Inst. C.E., for his Paper on "The Calculations and Investigations necessary in designing Iron Cylinder Bridge Piers;" 3. A Miller Prize to Alfred Fyson, Stud. Inst. C.E., for his Paper on "The English Standard Gauge *versus* Narrow Gauges for Railways;" 4. A Miller Prize to Joseph Prime Maxwell, Stud. Inst. C.E., for his "Notes on Railway Curves;" 5. A Miller Prize to Killingworth William Hedges, Stud. Inst. C.E., for his Description of "The Denver and Rio Grande Narrow Gauge Railway;" 6. A Miller Prize to Nathaniel St. Bernard Beardmore, Stud. Inst. C.E., for his Account of "The Reconstruction of King's Weir on the River Lee;" 7. A Miller Prize to Osbert Henry Howarth, Stud. Inst. C.E., for his Essay on "The Rationale of Permanent Way;" 8. A Miller Prize to Charles Graham Smith, Stud. Inst. C.E., for his Paper on "Mortar."

NOV. 11.—Mr. Hawksley, President, in the chair.—A Report was brought up from the Council, recommending the election into the corporation of two members and thirty associates, and stating that the following candidates had been admitted as students of the Institution:—Messrs. W. Y. Armstrong, W. P. Costobadie, H. T. Crook, J. G. Cruikshank, W. B. Dawson, T. Edwards, M. P.

Elliot, W. T. Foxlee, W. B. Godfrey, J. Hunter, H. D. Johnston, L. Lloyd, H. E. MacMahon, M. M. Minas, J. J. Mullaly, T. O'Hagan, H. C. Perram, G. B. Reynolds, C. S. Rolfe, A. Ward, and N Watts.—The paper read (which is given in another column) was "On the Design and Construction of Modern Locomotive Engines," by Mr. J. Robinson.

MICROSCOPICAL SOCIETY.

November 5th.—C. Brooke, Esq., President, in the chair. A paper, by the Rev. W. H. Dallinger was read, describing some further researches made by himself and Dr. Drysdale on the development of certain Monads, in the course of which they had been able to trace the life-history of a species, although in their earliest stages these organisms were so minute as to require an objective of one-fiftieth of an inch for their observation. A number of drawings accompanied the paper. Mr. A. Sanders read a paper "On the Art of Photographing Microscopic Objects," in which he described a simple and successful process of manipulation, and showed how the most satisfactory results might be obtained without the aid of expensive and complicated apparatus: full details were given as to printing, toning, and enlarging, as well as obtaining the negatives. A short discussion followed, in which Mr. Wenham, Dr. Matthews, the President, and Mr. Sanders, took part. A paper was also read, by Mr. S. J. M'Intire, entitled, "Some Notes on Acarellus," in which he minutely described a species found parasitic upon obisium, and which he believed to be identical with hypopus, described by Dujardin. The characteristics of another species were also detailed, and drawings in illustration of the paper were laid upon the table. Specimens, both mounted and alive, were exhibited under microscopes in the room. Some photographs of Naviculæ and *Amphipleura pellucida*, taken by Dr. J. J. Woodward, with a magnifying power of 1,380 diameters, were also exhibited to the meeting.

CHEMICAL SOCIETY.

Nov. 6.—Dr. Odling, President, in the chair. —The President delivered a short address, congratulating the Fellows on taking possession of their new rooms in Burlington House.—A paper was read, by Mr. D. Howard, "On the Optical Properties of some Modifications of the Cinchona Alkaloids," being an elaborate investigation of the variations in the rotatory powers of this class of bodies when examined by the polarimeter.—The other communications were, "A Preliminary Notice of the Oils of Wormwood and Citronella," by Mr. C. R. A. Wright,—"On the Estimation of Nitrates in Potable Waters," by Mr. W. F. Donkin, —and a "Note on the Action of Iodine Trichloride upon Carbon Disulphide,' by Mr. J. B. Hannay.

ANTHROPOLOGICAL INSTITUTE.

Nov. 11.—Professor Busk, President, in the chair.—Mr. P. A. Scratchley and Dr. D. Johnson were elected members —Mr. T. J. Hutchinson read a paper "On Explorations amongst Ancient Burial-grounds, chiefly on the Sea-coast Valleys of Peru." The Huacas or burial-grounds described in the paper were those on the coast-valleys between Arica and the Huatica Valley, close to Lima. The results of the author's examinations of the Pacha-Cámac inclined him to the belief that there were no evidences of either a temple of the Sun or a house of the Virgins there, as no proof exists, in spite of contrary statements, that the Incas ever occupied those valleys after they are said to have conquered the country. The colossal burial-mounds called Huacas in the Huatica Valley were depicted in the diagrams exhibited, as well as their dimensions, furnished from the trackings of Mr. Steer, a North American gentleman, who accompanied and assisted the author in his explorations. The strange peculiarity of those pre-historic earth-mounds arose from the fact of their terraces all approximating in their proportions to multiples of twelve.—Mr. F. Galton read a communication "On a Method of collecting Anthropological Statistics from Universities, Schools, Factories, and other large Bodies of Children and Adults"—Dr. Simms exhibited a flattened skull, found in Mameluke Island, Columbia River, and described in detail the practice of flattening the head in infancy among the native Americans.

GEOGRAPHICAL SOCIETY.

Nov. 3.—Sir Bartle Frere in the chair.—The President opened his address by referring to the expected attendance on that occasion of Sir Samuel Baker, prevented by illness, and read a letter from Sir Samuel, written before his illness. It was hoped that Sir Samuel would be able to attend on the 8th of December. The President passed in review the proceedings of the Geographical Section of the British Association's last meeting, and then touched upon the geographical discoveries brought to light during the recess.—Mr. Markham, the Secretary, read a paper "On the Discoveries of the Polaris," upon which there was a short discussion, and it was urged that, if the Government would not send out further expeditions, a voluntary effort should be made in this direction. Admiral Sherard Osborn opposed this view.

ROYAL INSTITUTION.

Nov. 3.—Geo. Busk, Esq., Treasurer, in the chair.—The Secretary announced the decease of Sir Henry Holland, the President, on October the 27th.—H. A. Focking, Esq., and Major J. A. Wood were elected members. The special thanks of the members were given to C. Woodward, Esq., for his present of his work on the "Polarisation of Light," and of much valuable apparatus illustrating the subject; and also to W. Salmon, Esq., for his donation of £10 for the promotion of scientific research in the Royal Institution.

SOCIETY OF BIBLICAL ARCHÆOLOGY.

November 4th.—Sir Henry Rawlinson, Vice-President, in the chair. The following candidates were nominated for election:—Rev. Prof. Campbell (Montreal); Rev. Dr. Douglas (Glasgow); Capt. E. Dumergue; Prof. T. Hayter Lewis, F.R.I.B.A.; Albert J. Mott; Alexander Peckover, F.R.G.S.

The following papers were then read:—

1. On Fragments of an Inscription giving part of the Chronology from which the Canon of Berosus was copied. By Geo. Smith. Mr. Smith commenced by describing the fragments of the tablet, which he believed to belong to the seventh century B.C. He then gave an account of the kings on the new tablet, and some others recently discovered. These monarchs included several belonging to the mythical period, and others of the historical. Among these were Zabu, who founded the temples of Sippara, Mili-sihu, and Merodach Baladan I., his son, who reigned in the fourteenth century B.C.; Simmas-sihu and his six successors, who reigned in the eleventh century B.C. The positions of the various monarchs and their reigns were discussed, and attention was drawn to the short average of the reigns in the best preserved fragment, seven kings only occupying forty-nine years and three months.

2. On a New Fragment of the Assyrian Canon belonging to the Reign of Tiglath-Pileser and Shalmaneser. By Geo. Smith. —The account of a fragment of the Assyrian historical canon followed.—This belongs to an important epoch about which there has hitherto been very little information, the period from B.C. 732 to 722, including the reign of Shalmaneser IV. The new fragment shows that there was no break or irregularity in the succession of the Assyrian eponymes at this period, and proves the accession of Shalmaneser to have been B.C. 727, a fact previously doubted by some scholars. The bearing of the new fragment on various Biblical dates and statements was gone into, the author being of opinion that this fragment, in conjunction with some other Assyrian inscriptions, tended to materially confirm the Biblical chronology.

The following gentlemen took part in the discussion:—Dr. Birch, M. Julius Oppert, Rev. A. H. Sayce, Geo. Groove.

VICTORIA INSTITUTE.

Meetings are to be held on Monday, December 1st, 1873, at which the following papers will be read:—"The Identity of Reason in Science and Religion." By the Rev. R. Mitchell. Monday, January 5th, 1874.—"Magnitudes in creation and their bearings on Biblical Interpretation." By the Rev. J. H. Titcomb, M.A.

ZOOLOGICAL SOCIETY OF LONDON.

November 4th, 1873.—Professor Newton, F.R.S., Vice-President, in the chair. The Secretary read a report on the addition that had been made to the society's menagerie during the months of June, July, August and September, 1873, and called particular attention to two Argus pheasants (*Argus giganteus*) from Malacca, presented by Sir Harry Ord, C.B., Governor of the Straits Settlements, and a pair of Ceylonese jungle-fowls (*Gallus stanleyi*), presented by Henry Bayley, Esq Mr. G. Dawson Rowley, F.Z.S, exhibited a singular malformed variety of the domestic duck, and the Secretary a collection of fishes (containing six examples of *Ceratodus forsteri*) made by Mr. Ramsay, C.M.Z.S., in Queensland. An extract was read from a letter received from Mr. R B. N. Walker, C.M Z.S, addressed to Dr. J. E. Gray, F.R.S., and communicated by him to the society, respecting Mr. Walker's endeavours to obtain living gorillas for the society's collection. A communication was read from Mr. J. B. Perrin, containing an account of the Myology of the Hoatczin (*Opisthocomus cristatus*). A communication was read from Capt R. Beavan, Bengal Staff Corps, C.M.Z.S., containing a list of fishes met with in the River Nerbudda, in India. A second communication from Capt. Beavan contained some remarks on certain difficulties involved in the acceptance of the Darwinian theory of evolution. A communication was read from Mr. Montague R. Butler containing descriptions of several new species of diurnal Lepidoptera. A communication was read from Mr. R Swinhoe, H.B.M. Consul at Chefoo, on the Song-Jay of Northern China, with further notes on Chinese ornithology. Mr. P. L. Sclater, F.R.S., exhibited and pointed out the characters of 14 new species of birds collected by Signor Luigi Maria D'Albertis during his recent expedition into the interior of New Guinea. A communication was read from Professor J. V. Barboza du Bocage, F.M.Z.S., on the Ground Hornbill of Southern Africa—*Buceros caruncula tus cafer* of Schlegel. A second communication from Professor Barboza du Bocage contained a note on the habitat of *Euprepes coctei*, Dum. et Bibr. A communication was read from Surgeon-Major Francis Day, F.Z.S., containing descriptions of new or little known Indian fishes. Mr. R. B. Sharpe, F.Z.S., read a paper describing the contents of a collection of birds recently received from Mombas in Eastern Africa. A second paper by Mr. R. B. Sharpe contained a list of a collection of birds from the River Congo. Mr. G. B. Sowerby, jun., communicated the descriptions of eleven new species of shells A communication was read from Dr. J. E Gray, F R.S., on the skulls and alveolar surfaces of land tortoises—*Testudinata*.

November 18th, 1873.—Dr. A. Günther,

F.R.S., Vice-President, in the chair Mr. Slater exhibited and pointed out the characters of new species of birds obtained by Mr. Salmon during his recent expedition to the State of Antioquia, Columbia. These were *Chlorochrysa nitidissima* and *Grallaria ruficeps*. A letter was read from Mr. R. Swinhoe, H.B.M. Consul at Chefoo, containing a note on the white stork of China, and stating that he had recently obtained a live *Pitta* in China, which appeared to be *Pitta nympha* of the Fauna Japonica. Mr. A. H. Garrod exhibited and pointed out certain peculiarities in the cæcum of a crab-eating fox (*Canis cancrivorus*). Mr. J. E. Harting, F.Z.S., exhibited and made remarks on a curious variety of the common partridge shot in Northumberland. Mr. Sclater exhibited and made remarks on a pair of horns of the new Bubaline antelope from the Bogos country, lately named *Alcelaphus tora* by Dr. Gray. A communication was read from Dr J. E. Gray, F.R.S, containing a paper by Dr. Edward L. Moss, surgeon in charge R. N. Hospital, Esquimalt, on a singular Virgularian Actinozoon taken at Burrard's Inlet, close to the Northern Mouth of the Frazer River. A communication was read from Dr. O. Finsch, C.M.Z.S. containing the description of a most remarkable and interesting new Passerine Bird which he had received from Mr. T. Klinesmith of Levuka, Ovalou, Feejee Islands. This little bird which was not only new as a species, but also the type of a new genus, he proposed to call *Lamprolia Victoriæ*. A communication was read from Mr. W. S. Atkinson, of Darjeeling, containing the descriptions of two new species of butterflies from the Andaman Islands, which were named respectively *Papilio mayo* and *Euplœa andamanensis*. Dr. Cobbold communicated the first of a series of papers entitled "Notes on the Entoza;" being observations based of the examination of rare or otherwise valuable specimens contributed at intervals by Messrs. Charles Darwin, Robert Swinhoe, Charles W. Devis, the late Dr. W. C. Peachy, Dr. Murie, and others. Mr. Edwin Ward, F.Z.S., exhibited and gave the discription of a new bird of Paradise, of the genus *Epimachus*, which he proposed to call *E. ellioti*. A communication was read from Surgeon-Major Francis Day, F.Z.S., containing remarks on Indian fishes, mostly copied from the original manuscripts of the late Dr. Hamilton Buchanan Mr. J. W. Clark, F Z.S., read a memoir on the eared seals of the Auckland Islands, one of which he recognized as *Otaria hookeri*, thus fixing the locality of this species.

The next meeting of the society for scientific business will be held at the society's house, Hanover-square, on Tuesday, the 2nd of December, 1873, at half-past eight o'clock, p m., when the following communications will be made:—1.—Dr. James Hector, C.M.Z.S —On *Cnemiornis calcitrans*, showing its affinity to the Natatores. (Received 16th October, 1873.) 2.—Mr. W. H. Hudson,—On the habits of the Pipit of the Argentine Republic. (Received 15th September, 1873) 3.—Mr. A. G. Butler.—Revision of the genus *Protogonius*. (Received 24th October, 1873)

STATISTICAL SOCIETY.

NOVEMBER 18.—Dr. W. A. Guy, President, in the chair.—Among the candidates elected were the Baroness Burdett-Coutts, the Earl of Roseberry, Lord Lawrence, Sir W. Jones, Bart., Sir H. L. Anderson, and others, in all thirty-two.—The evening was occupied with the Inaugural Address of the President.

MATHEMATICAL SOCIETY.

NOVEMBER 13.—Prof. Cayley, and subsequently Mr. J. J. Sylvester, in the chair.—Mr. Sylvester and Lord Rayleigh were elected in the Council, in the place of the retiring Members, Prof. Crofton and Mr. Stirling.—Mr. Sylvester gave an account of a new instrument for converting circular into general rectilinear motion, and into motion in conics and higher plane curves.—Mr. W. Adams exhibited and explained the mode of operation of his Mensurator and Cœlometer, and gave a brief account of the objects to which they could be applied.—Mr. S. Roberts read a short note "On the Expression of the Arc of a Cartesian by Elliptic Functions." The purport of the note was that the hyper-elliptic part of the integral which gives the value of an arc of a Cartesian is reducible to the form which Jacobi has shown to depend on elliptic functions.

A HORRIBLE INVENTION.—In a recent number of that instructive and pleasant journal *The Antiquary* a correspondent (H. Fraser) writes:—"I have in my scrap-book an engraving of a diabolical machine, entitled the 'Jungfern Kuss,' or Virgin's Kiss. It is of metal, shaped outwardly like the figure of a woman in an ancient costume of about the fifteenth or sixteenth century, with a matronly-looking face. The front of the machine opens outwardly, disclosing a number of blades or spikes, on a level with the face and breast, and at the bottom is a circular plate. I have lost the description of the machine; but to the best of my recollection, it stated that the original had been purchased by an antiquary (whose name was not given), from a person who had obtained it, by means which would not bear investigation, from the arsenal of Nuremberg. The description went on to say that the machine was used for putting persons to death, by thrusting them inside and closing the front, when two of the blades pierced their eyes and several others the breast, and the circular plate beneath their feet opened and let them through into the apartment beneath, in which was placed a machine consisting of six revolving cylinders, studded with sharp blades, on which the body fell, and which cut it to pieces, the spaces between the cylinders being graduated so that the lowest pair were the closest, and the fragments of mortality then dropped into a running stream which passed through the dungeon. I should be glad to hear whether this horrible machine is still in existence, and if so, in whose possession it now remains, also who was the inventor."

An important work on the mineral resources of Italy is in course of publication. Under the title of "I Tesori Sotterranei dell' Italia," the Chevalier Jervis, of the Royal Industrial Museum at Turin, is writing a full description of the mineral-bearing localities throughout the kingdom. The first of three volumes has just appeared, and contains a description of the Alpine Region of Italy; the next volume will describe the Apennine Region; and the third will take in the Italian Islands.

The first organization of an international service in France, for the application of the electric telegraph to the concentration of meteorological observations, was made by M. Le Verrier, in 1855. *Les Mondes*, of October 16, informs us that, on the 15th the Observatory of Paris was put in daily relation with seventy-five meteorological stations, spread over the whole of Europe (including Greenwich, Scilly, Scarborough, and Yarmouth in the British Isles), and with several places in Africa. The *Bulletin International*, published by the Observatory, will give regularly for each day the observed pressures and temperatures, the direction and force of the wind, and all other observed meteorological observations from each station.

Whether the modern chemical formulæ should or should not be introduced into mineralogy is discussed by Von Kobell in an interesting paper published by the Bavarian Academy of Sciences, and reproduced in *Poggendorff's Annalen*.

Correspondence.

TIDAL ENGINES.

To the Editor of the SCIENTIFIC AND LITERARY REVIEW.

SIR,—The following is the substance of a communication by me to the Section of General Physics of the British Association, September, 1873:—

THE DIRECT UTILISATION OF WATER POWER, AND OF TIDAL FORCE.

It may be assumed that for all practical scientific purposes, the ancient water wheel, or the more modern adaptation of the screw hydraulic engine, effects the most perfect economical utilisation of any given gravitation of water which can produce mechanical action only in a direct basis of the height of the fall, and the quantity of water available as a motive force.

The writer of this memoir would, therefore, only suggest the possibly convenient application of the scheme which he now proposes to any ordinary water friction, or precipitated head of water. The object of his invention being more peculiarly with reference to the useful employment of tidal force—a naturally existent energy or powerful mechanical agency which men, to this late period of the world's historical annals and wonderful accumulation of scientific discovery, have allowed to run to waste, and without any practical employment by the enterprising industries of the universe.

An immense natural force is hidden and unemployed in this perpetually acting motive power, equal to a constantly acting dead weight or gravitating force of 287,900,000 tons upon the general shore line of Great Britain.

The mode in which the author of this memoir would propose to employ a portion of this natural force—or provident gift of nature—would be by conducting the tidal waters by pipes in suitable localities to an engine placed at half tide level.

This engine would be of the simplest mechanical device, any number of cylinders receiving the injection, which latter would propel a piston in each, to drive by ordinary process any required motive arrangement.

Slide valves working upon the lower convexity of the cylinders would at the end of each stroke open for the free discharge by gravity of the expended volume of water, which would be introduced alternately upon each side of the piston, as in the ordinary steam engine. An air pump attached to the engine might be found to aid in the free relief of the expended volume of water. The water thus discharged would be made to run into the reservoirs formed below the level of the engine itself, and these reservoirs would discharge themselves on the efflux of the tide, and be again ready for use from each staff to full and half ebb, or for six hours constant work in every twelve hours.

The force obtained in this engine would be cumulative, averaging in these six hours of work, upon a tide of 10 feet, 2½ lbs. on the square inch of piston, with a cylinder of 3 feet diameter and stroke of 6 feet, upon a surface of piston of 1,036 square inches, giving a force of 2,592 lbs., or one ton and one-sixth, at a speed of 45 strokes per minute, furnishing with one such cylinder an engine of 23-horse power, or with a cylinder of 6-feet diameter, stroke 6 feet, and 45 strokes per minute, an engine of 87-horse power.

The 3 feet cylinder would discharge in 6 hours' work 709,640 cubic feet of water, requiring a reservoir of large capacity to contain it until the last hours of the ebb tide, when it would empty itself by means of culverts or syphon pipes into the adjacent estuary. 12 syphons or culverts of 3 feet diameter would clear the reservoir of its contents in half an hour at low tide.

The necessity for so large a waste reservoir, at a depth equivalent to the whole rise of the tide, would confine the employment of such an engine to localities where such excavations could be conveniently and economically contrived.

This effluent water could, however, be again made use of in working the engine during the recess of the tide, by simply conducting a discharge syphon through the cylinder.

The 3 hours of first-flow might also similarly be utilised by constructing a second auxiliary reservoir below the level of low water. The emptying of this second waste reservoir would be effected by means of a pumping apparatus, worked by the engine itself, or by a water-wheel fixed in the discharge of culverts, which operation would neutralise the force temporarily obtained in the 3 hours of first flood; but the advantage would thus be achieved of the uninterrupted and continuous working of the tidal engine, which is now proposed. A constant unintermittent power might also be maintained by a very simple compensatory process.

It should be remarked that the dimensions and hypothetical details of the proposed engine are assumed merely for the purpose of more clear exposition, and are not altogether such as would be adopted practically; as, for instance, in speaking of a single-cylinder in place of the ordinary combined system, &c.

It may finally be remarked that, with a 3 foot cylinder, working at half-power, the retardment would be one-half, giving 23 strokes per minute, equal to 11-horse power, discharging 12,880 cubic yards of water in the 6 hours, and requiring a reservoir of 130 yards by 100 by 3 feet deep, or 65 by 50 and 6 feet deep.

A double-cylinder engine of 3 feet diameter as above would work to 23-horse power, and would require a waste-water reservoir of 260 yards by 100 and 3 feet deep.

J. Napier.

Salisbury, Nov. 3rd, 1873.

PHRENOLOGY.

To the Editor of the Scientific and Literary Review.

Sir,—With reference to Mr. A. L. Vago's note in your journal of the 1st ult., so long ago as the year 1825, the late Mr. Thomas Wakley boldly advocated the truth of this science as it was taught by Dr. Gall and Dr. Spurzheim, as may be seen by reference to the *Lancet* for that year, and subsequently. In the *Zoist*, for thirteen years, 1843-55, the late Dr. Elliotson, and other medical men, elucidated the truth of this valuable science. I could produce at least 100 certificates published by notable physicians, surgeons, &c., in favour of this science, and which were collected by the late Mr. George Combe. The "Twenty-five years Ago," of the *Times* writer, of the 24th September, only takes us back to the year 1848, twenty years after Mr. Combe published his "Constitution of Man." But, long before 1828, the objections of Dr. J. Gordon, Lord Jeffery, and of other critics, had been demolished by Mr. G. Combe. It is useless for any journal to contend, successfully, against such evidence as Mr. C. Combe produced in favour of the science, which the Government ought to support. I am convinced that it is most valuable with reference to lunatics and criminals. See the testimony in favour of the science, published in "Combe's Phrenology," vol. 2.

I am, Sir, yours obediently,

Chr. Cooke.

London, Nov., 1873.

Durham Cathedral.—In addition to the several stained glass windows which have already been inserted in the Nine Altars and south transept of Durham Cathedral, it is understood that the Freemasons of that city are about to place a window in the Nine Altars in memory of Mr. John Pawcett. Major Joicey and the Dean are also about to add stained windows to the south aisle, whilst other persons are also mentioned as being probable contributors to similar desirable improvements and additions to the many architectural and other attractions of the cathedral.

Historical Portraits.—At a recent sale at Clapton House, near Stratford, many pictures possessing considerable historic interest were disposed of. Among the portraits was the original painting of George Carew, Earl Totneys, famous for his dealings with the Spaniards during Elizabeth's reign. There was also a fine portrait of Shakespeare, who was a frequent visitor at Clapton House, and one of the mother of Oliver Cromwell raading her Bible. The other portraits were a half-length of James II, by Lely; William III. by Kneller; General Ireton, two of Queen Elizabeth, Henry IV., and a full-length of Arabella Stuart. Mr. Graves, of Pall-mall, was the principal purchaser.

An Ancient Greek Manuscript.—Mr. John Strachey Hare has placed in the hands of Professor Newman the facsimile of a Greek MS., purchased in Egypt by Mr. Arden, of Rickmansworth Park. It consists of forty-eight narrow columns, equivalent to sixteen closely-printed octavo pages. Professor Newman has translated the whole into English, and although some of the columns are mutilated, and particularly in places of interest, nevertheless, one gets a pretty complete understanding of the whole. It contains two Attic orations, by a contemporary of Alexander the Great. The Greek is excellent, and very easy.

Ancient American Civilization.—All through their country are ruins of great fortresses, towers, aqueducts, and other public works, the origin of which is unknown to the present Indians, or only vaguely known by tradition. Some of these houses contained from one hundred to one hundred and sixty rooms. In Pecos the ruins of a Christian Church and a temple to Montezuma stand side by side—the pagan temple being apparently the oldest of the two—just as the two religions may have for a time flourished alongside of each other. According to Indian tradition, it was built by Montezuma himself, who charged them not to lose heart under the foreign yoke, and never to let the sacred fire burn out in the *estufa*, for "when the time should come in which the tree should fall, men with pale faces would pour in from the east and overthrow their oppressors, and he himself would return to build up his kingdom; the earth would become fertile, and the mountains yield abundance of silver and gold." How the Spaniards came and conquered them is, according to them, a partial fulfilment of Montezuma's prophecy; and how the Americans with the pale faces came in their turn and drove out the Mexicans, may be taken as a second part of the fulfilment; the third they are still waiting for. The Pimas themselves state that at one time they used to live in large houses, and were a great and powerful nation; but after the destruction of their kingdom they travelled southward, and settled in the valley where they now live, preferring to live in huts, so that they might not become a subject of envy for a future enemy.—"Cassell's Book of the Races of Mankind."

Experiments have been conducted by Prof. Jacobi, of St. Petersburg, with the view of determining whether the electro-deposition of iron is affected by powerful magnetic influences. Accordingly solutions of the double sulphate of iron and magnesia were reduced in two vessels, side by side, and placed under similar conditions, except that one of them was surrounded by an electro-magnetic spiral. After the experiment had continued for a month it was foun that the same weight of iron was reduced in each vessel. The iron, in both cases, was deposited in the form of a tube on a cylindrical core, but in the vessel surrounded by the solenoid the particles of iron were curiously aggregated towards the two ends of the tube.

"Annales de Chimie et de Physique" for November, contains the results of the comparative observations which M. Marchaud has regularly recorded for several years, on variations in the actinism or chemical force of sunlight. As a sensitive agent, he employs a mixture of a solution of oxalic acid and perchloride of iron.

M. Berthelot continues his valuable researches on different forms of natural and artificial carbon. He has now examined the carbon found in the meteorite from Cranbourne, near Melbourne; the carbon from certain rocks of reputed meteoric origin in Greenland; a large number of samples representing different varieties of natural graphite; and carbon artificially deposited from carbonic oxide by the action of iron.

M. de Saint-Florent writes to the "Bulletin de la Société Française de Photographie," that by a new process, he has obtained heliochromic proofs whose colours have the closest relation with the natural colours. Landscapes have also been obtained, but the colours were faint. His processes are published in the journal named, No. 9, for 1873.

Mr. William Crookes has, at the request of Sir William Muir, of the Army Medical Department, drawn up a "Memorandum on the Purification of Drinking Water, with special reference to that which is likely to be met with on the Gold Coast."

Some interesting experiments on Prince Rupert's Drops have been made by M. Victor de Luynes. Instead of inducing the rupture of the glass by mechanical means, he subjects the drop to the slow solvent action of hydrofluoric acid. The solution proceeds quietly, whether the inflated end or the delicate tail be acted on, until a certain point is reached, at the origin of the neck, when the remainder of the drop suddenly becomes disintegrated.

APPLICATIONS FOR LETTERS PATENT.

(*Continued from page* 186.)

On September 4th.—2906 to 2917.—G. Leggett. School furniture, parts of which improvements are applicable to other purposes.—J. A. Forrest and W. Hayes. Waterclosets.—E. Worroll. Apparatus for withdrawing water from pipes heated by steam, and arrangements in connection therewith.—V. Driver. Apparatus for cleaning and polishing table cutlery.—M. Tardioli. Sowing machine, termed "Tardioli's mechanical drill."—G. Haseltine. Machine for burnishing photographic pictures (com).—E. G. Brewer. Improvements in or connected with calenders used in the manufacture of paper (com.)—W. Brenton. Reaping machines.—E. Davies and T. J. Walker. Apparatus for heating the feed-water of steam boilers.—R. Stone. Construction of arches, bridges, floors, ceilings, and other like structures, also the construction of walls, and other like erections.—D. Broun. Apparatus for stoppering bottles.—F. H. Holmes. Fog signals, suitable for lighthouses and lightships.

On September 5th.—2918 to 2928.—G. F. Neville. Method or process of manufacturing or fabricating leather, and of bleaching, dyeing, and staining the same.—C. Anderson. Means and apparatus for propelling tramway cars.—J. J Perry. Stoppers for bottles and other articles.—J. Noad. Construction and manufacture of fire-lighters, and improved machinery to be employed therein.—J. Tyrer. Buckles for fastenings for braces, belts, and bands.—W. Hodson. Machinery for the manufacture of bricks, tiles, and other analogous articles.—F. Wilkinson. Improvements in ascertaining and indicating the work done by machinery used in preparing, spinning, doubling, and weaving cotton and other fibrous materials, and apparatus connected therewith.—T. B. Hitchman. Sewing machines. —S. Simmons. Manufacture of hats, and similar coverings for the head.—T. Fardon. Expansion gear for steam and other engines.—F. Sénéchal. Dress and figure improvers.

On September 6th—2929 to 2943.—W. F. Gedge. Machine for cleaning and winnowing grain and seed (com).—A. Hobson and W. C. Williams. Velocipede.—N. Macphail. Mode and means of and apparatus for registering and checking the number of payments made by passengers in tramway and other public carriages or omnibuses. —J. H. Johnson. Reversible flock-cutting machines (com.) (Complete specification.)—W. MacLean. Printing, lithographing, or zincographing on textile fabrics.—T. Flitcroft. Carding engines.—L. Bourget. Propelling vessels, and apparatus to be used therefor.—L. Bois, fils. Manufacture of lighting gas, and apparatus employed therein.—J. R. T. Mulholland. Hackling machines.—A. T. Rousseau and C. H. Stevenct. Melodions or American organs. —J. McGregor. Improvements in mechanism or apparatus to be employed for glazing and polishing saws and other similar articles having flat metallic surfaces.—W. A. Gilbee. Hydraulic motive machine or engine (com.)—P. Charpentier. Apparatus for heating furnaces. (Complete specification.)—W. Single. Apparatus for locking railway switches.—G. Haseltine. Valves for steam engines (com.)

On September 8th.—2944 to 2955.—W. Hunt. Apparatus for the manufacture of sulphate of soda and sulphate of potash.—H. Rogers Cut nails. (com.)—A. C. Henderson. Sewing machines for working two needles either simultaneously or independently, and moveable shuttle carriages in connection therewith (com.) —R. Hatch. Improvements in the construction of pickers used in looms for weaving.—H. A. Bonneville. Self-acting machinery for sowing potatoes (com.)—F. Byart. Apparatus for cutting after weaving the velvets and other fabrics which are woven face to face.—G. Grange. Improvements in the use of paper substituted for cardboard in jacquart machines.—R. Boyd. Improvements applicable to furnaces or fireplaces for the generation of heat by the combustion of fuel (com).—W. E. Lilly. Box or case for holding reels, bobbins, or other devices containing thread, ribbon, cord, braid, and other fabrics.—H. E. Newton. Blast furnaces (com.) —A. F. Wilson. Manufacture of gas.—T. Newton. Military and other saddles.

On September 9th.—2956 to 2964.—L. Fréret. Electric battery (com.)—E. P. Jones. Brakes for railway carriages and waggons.—J. Lanham. Manufacture of boots and shoes.—R. Dobbie and P. Forbes. Damper or throttle valve chamber, or flue for stoves.—H. E. Newton. Blast furnaces (com.)—J. Higgins. Machinery for spinning and doubling cotton and other fibrous materials.—W. E. Newton. Steam boilers and condensers (com.)—A. M. Clark. Diamond-cutting machines (com.)—W. Smith, younger. Machinery for breaking stones, ores, sugar, bones, or other hard or brittle substances. (Complete specification.)

On September 10th.—2965 to 2978.—H. Archer. Protection for hind legs of horses from injury, consisting of saving boot made of leather, with laced sides with elastic one to be worn on each hind leg.—H. A. Bonneville. Regulator or governor for adjusting the speed or rotary motion of steam engines (com). (Complete specification.)—A. Harder. Reaping and mowing machines.—C. Mohr. Manufacture of metal deed and other boxes, travelling trunks, portmanteaus, and similar articles.—W. Moseley. Electrical signal apparatus.—T. L. Phipps. Clippers for clipping horses and other animals, and for other like purposes, and instruments or apparatus for sharpening the teeth or cutters of clippers.—H. Holland. Manufacture of gas for illuminating and heating purposes.—C. Jurgenson. Weeding and seed-gathering machine (com.)—E. S. Robinson. Machinery for the manufacture of satchell or rectangular bottomed paper bags (com.)—D. O. Edwards. Means and apparatus for producing and radiating heat.—J. H. Johnson. Rotary engines (com.)—W. B. Brain. Electric fusees for discharging dynamite, lithofracteur, and other blasting bodies or compounds.—H. E. Newton. Feed-water indicator for steam boilers (com.)—W. E. Newton. Construction of superstructure and foundation of bridges (com.)

On September 11th.—2979 to 2995.—J. L. Whitmarsh. Book rests for invalids.—J. Gedge. Clip, or instrument for clipping or shearing animals (com.)—J. A. Dixon. Process for treating copper pyrites, copper blendes, and other sulphuretted copper ores which contain iron (com.)—J. H. Johnson. Mechanical puddling of iron and apparatus or means employed therein, also regenerative furnaces to be used therefore, and for other purposes where gaseous fuel is applicable (com.)—W. Calvert. Sliver cans.—W. B. Brain. Combinations of ingredients for producing explosives for blasting and mining purposes.—A. Johnson. Sewing machines.—T. Smedley. Sheathing or protecting iron and steel ships or vessels from corrosion and from the adhesion thereto of animal and other matter.—N. D. Spartali. Propellers, and the mode of applying the same to the propulsion of floating vessels.—T. A. Edison. Perforated paper for telegraphic purposes, and means for receiving and transmitting with the same.—C. G. Haiston. Breech-loading firearms.—J. W. Martin. Pistons.—F. Wirth. Circulating lubricators for journal boxes and bearings of quickly revolving shafts, spindles, and also for revolving pulleys and similar objects (com.)—F. Wirth. Coupling for railway waggons (com.) A. M. Clark. Endless railway or travelling street sidewalks, partly applicable for coupling other railway carriages (com.)—A. Clark. Screw valves (com.)—W. Jones. Apparatus for propelling and steering ships and other vessels.

On September 12th.—2996 to 3004.—J. J. Perry. Mechanical toy (com.)—S. Mason and M. Alcock. Kiers employed in the bleaching, scouring, or treatment of woven fabrics, yarns, and other materials or substances.—E. G. Phillips. Fire-lighters.—J. Grimshaw. Coating for rendering nails, washers, bolts, nuts. and other similar articles anti-corrosive.—F. Kingston. Shaping and joining strips of cane or wood for cricket bat handles or other purposes.—C. J. Everickx. Folding or portable chairs, seats, and other analogous articles.—W. E. Newton. Bridges (com.)—G. B. Boomer. Screw press.—C. Winn. Gas lamps.

On Septemper 13th.—3005 to 3014.—W. A. McVa'on. Apparatus used in the manufacture of gas.—C. W. Tozer. Water waste preventers for waterclosets, urinals, washing, and other apparatus.—T. Hyatt. Windmills (com.)—H. Alder. Beds, hammocks, mattresses and seats of sofas, couches, chairs, and other similar articles.—T. Baker. Apparatus for stopping the bung, vent, and tap holes in casks, and for stopping mouths or orifices of jars, bottles, flasks, and other similar vessels.—H. M. Richardson. Jacquard apparatus employed in looms for weaving.—G. W. Richardson. Means or apparatus for ventilating and pumping purposes.—W. R. Lake. Adjustable brackets for use in dental operations, supporting reading and writing desks, and the like, and for other similar purposes (com.)—E. T. Hughes. Manufacture of the salts, carbonates, and hydrates of baryta and strontia, and also for improved modes of making baryta and strontia caustic (com.)—E. T. Hughes. Treatment of the liquors used in scouring or cleaning wool (com.)

On September 15th.—3015 to 3028.—T. Shakespear and G. Illston. Sewing machines.—F. T. Sutton. Construction of cases for containing clocks or other apparatus having dials (com.)—W. Walker. Apparatus for regulating and controlling the temperature of liquids and fluids.—E. Marsden. Improvements in and applicable to pans for boiling down, reducing, or concentrating liquids, parts of which improvements are applicable for condensing or refecting liquids whilst pruning and boiling over.—J. Dodd. Mules for spinning and doubling cotton, wool, and other fibrous materials.—C. H. Wetzel. Reservoir penholders, and means of preserving a supply of ink therefrom (com.)—A. Turner. Sewing machines (com.)—T. Smith. Apparatus employed in concrete building.—T. A. Weston. Apparatus for transmitting, regulating, and arresting motion in machinery.—J. N. Paxman. Feed-water heater, applicable also for other purposes. —H. Greener. Manufacture of decanters and ornamental glass bottles and jugs.—J. Wood. Apparatus for embroidering.—H. Cock. Means or apparatus for supporting boilers (com.)—F. D. Mott. Rotary engine.

On September 16th.—3029 to 3046.—J. Edwards. Locks and striking plates for the same.—C. J. Ball. Machinery and apparatus for breaking and crushing stone or other hard substances.—W. P. Francis and F. Addiscott. Manufacturing coffeetina.—D. J Kennelly. "Getting" and treatment of peat for the manufacture of fuel, the utilizing of waste heat for drying the peat, also the obtaining of distillatory products therefrom, and the machinery, apparatus, or means employed therein.—J. Bell. Washing machine (com.)—J. Owen. Steam boilers.—J. Roberts. Brakes for broughams, phaetons, waggonettes, dog carts, and other two and four wheeled vehicles.—G. F. Cornelius. Compound or mixture to be used for lubricating purposes, and for grinding and reducing white lead and colours.—T. Jones. Rendering wood uninflammable, applicable to building and other purposes.—G. T. Bousfield. Apparatus for obtaining motive power from the rise and fall of the tide.—E. Bagot. Manufacture of tin and terne plates, and the apparatus employed therein.—J. Whichcord. Construction of fire-proof buildings.—R. H. Cowins. Switch locking apparatus.—C. Peters. Horse collars.—A. Turner. Manufacture of india-rubber hose and tubing, and the preservation of india-rubber, gutta percha, and rubber fabrics (com.)—T. Fuchy. Ornamentation of articles formed from gold.—J. Gedge. Machine or apparatus for varnishing sheets of tin, and for other purposes (com.)—E. A. Bourry. Steam boilers.

On September 17th.—3047 to 3056.—G. Haseltine. Machinery for opening, cleaning, scutching, and lapping cotton and other fibrous materials (com.)—W. Schreiber and P. Passavant. Apparatus for the manufacture of corks. —W. Whiston. Dying and printing silk fabrics.—J. W. Connon. Seat and desk for use in schools and other places.—J. H. Johnson. Machines for heckling hemp, flax, and other similiar fibrous substances (com.)—J. H. Johnson. Operating the valves of steam engines (com.)—H. Gardner. Mode of and apparatus for ventilating furnaces (com.)—J. Toner. Treating or preparing soap tablets.—P. Penn-Gaskell. Weighing scales (com.)—A. W. Gilman and S. Spencer. Manufacture and treatment of beer in order to preserve it, and to restore it when it has become sour.

On September 18th.—3057 to 3073.—J. Roturier. Life buoy with tractive cable.—C. Chapman. Safety apparatus for saving life and property at sea. —J. H. Johnson. Automatic regulating valves. (com.)—G. Haseltine. Process of tanning hides, skins, or pelts, and cleaning wool and fur (com.) (Complete specification.)—R. Punshon. Anchors for ships.—C. Lucop. Arrangement and construction of steam ships and other floating craft, for mercantile, war, or other purposes.—J. E. F. Aylmer. Apparatus for the manufacture of ground wood pulp.—G. Haseltine. Manufacture of printer's type (com.) (Complete specification.)—E. Cottam. Safes.—J. Ryo, A. Ryo, H. Ryo, and S. Emsley. Machinery or apparatus for twisting wool, cotton, silk, or other fibres before or after spinning.—J. Fielding. Railway brakes and the mode of working them —J. A. A. Buchholz. Treating corn, rice, and other grain, and apparatus for the purpose.—C. Watts and T. C. Watts. Lubricating axle-box.—W. R. Lake. Manufacture of fertilizing substances and apparatus therefor, and the means for preventing the escape of offensive odours during such manufacture, and from slaughter-houses, rendering tanks and the like (com.) —P. Spence. Treatment of phosphates of iron and alumina for the purpose of obtaining certain useful products therefrom.—A. Lely. Drilling and shaping machines.—A. V. Deshayes. Embroidering machines.

On September 19th.—3074 to 3085.—R. Smith, jun. Machines for decorticating, cleaning, and polishing rice, grains, and seeds.—W. R. Holyoake. Fixing transparencies to lamps, windows, and other articles adapted for the passage of light. —J. B. Stone. Miners' safety lamps.—J. W. Martin. Tube expander and stopper.—S. J. Moore and R. H. Courtenay. Compound motive-power electro-magnet.—W. Scott and A. E. Bruno. Back sight for fire-arms.—C. D. Abel. Blue dye or colouring matter named "Violaceine" (com.)—J. Harrington. Locks or fastenings.—S. Sanderson and A. Proctor. Means apparatus for economising the waste heat and gases from boilers and other furnaces, part thereof being useful as a water or liquid meter.—A. Wilkinson. Coating and preserving telegraph wires, ropes, and cables.—W. W. Greener.

Breach-loading guns, rifles, and pistols.—C. N. Eyland. Buckles or clasps for braces, belts, and bands.

On September 20th.—3086 to 3096.—J. Fottrell. Composition for the manufacture of pipes and tubes suitable for water at high pressure, and as conduits for sewage purposes, gas, brine, and other saline liquors.—T. A. Scott. Washing machine and appliances connected therewith.—T. Moy. Mode of working the slide valves of steam engines.—J. Day and B. P. Walker. Draw-plate or blower for cooking ranges.—W. B. Smith and J. Starley. Sewing machinery, and tuck markers to be used therewith.—H. Negretti and J. W. Zambra. Thermometers.—H. Deacon. Manufacture of alkali.—T. Wood and J. K. Howitt. Stall fittings for stables.—Dr. E. A. Crane. System for economising the heat of open fire-places in the warming and ventilating of dwelling-houses and other buildings.—J. Gray, Knt. and M.P. Apparatus for damping paper for printing.—J. S. Mignot. Manufacture of twilled fabrics for covering umbrellas, sunshades, and parasols.

On September 22nd.—3097 to 3106.—H. Bradwell Manufacture of umbrellas, and the mechanism employed therefor.—J. W. Gray. Machinery for decorticating, cleaning, and polishing rice and other grain and seeds.—D. Grimshaw. Cut-nail machinery.—J. C. Mewburn. Construction of buildings, and the manufacture of the stones or materials to be employed therein (com.)—J. C. Mewburn. Lighting railway carriages with gas, and apparatus employed therein (com.)—J. A. Cumine. Apparatus for exhibiting and magnifying photographs and other pictures or objects.—J. M. Croft. Buffers for railway rolling stock and other vehicles running in trains.—W. R. Lake. Machinery for rolling steel and iron (com.)—W. Lightwood. Apparatus for making cartridges.—H. Barraud. Treatment of photographic surfaces and pictures.

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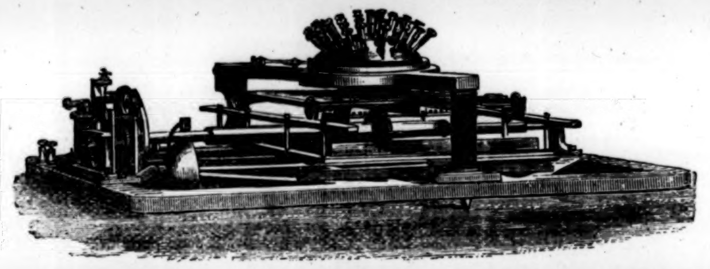

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London: Printed by H. W. FOSTER, 16, Bear Alley, Farringdon Street, E.C.; and Published for the Proprietors at 21, Cockspur Street, Charing Cross; and Sold by W. KENT & Co., 23, Paternoster Row, and SAMPSON LOW, SON, & MARSTON, English, American, and Colonial Booksellers and Publishers, Crown Buildings, 188, Fleet Street, London, E.C.

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